FOOD MANUFACTURE

Incorporating Food Industries Review

LISHERS: LEONARD HILL LIMITED, 17, STRATFORD PLACE, LONDON, W.1 JANUARY 1, 1943

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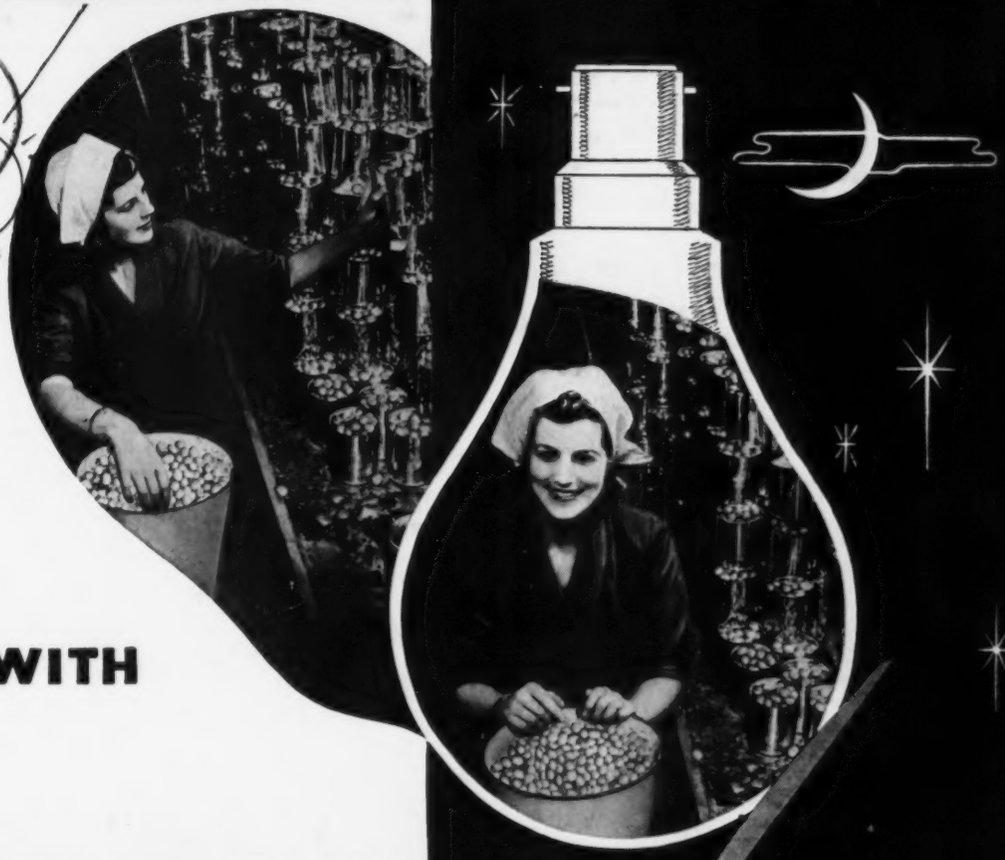


See IT THROUGH WITH

PHILIPS *Lamps*

PHILIPS LAMPS LIMITED, CENTURY HOUSE, SHAFTESBURY AVENUE, LONDON, W.C.2.

Perfection!

(IN YOUR BALANCE SHEET, TOO!)

"At our last stock-taking the stationery figure — of which the greater part was labels — was £20,000." It needn't be!

"Ours is a smaller business, but our label inventory is generally £5,000." It needn't be!

THERE is no need to order large quantities of labels to get a low price if you buy "the LITHESK way." No need to anticipate next year's needs to help this year's price. No need to do anything except provide for your monthly requirements in freshly printed, highest quality LITHESK labels, whose perfection is as big a stimulant to sales as their cost is a relief to your budget.

For "the LITHESK way" has transformed your label problem overnight — though it took six years of technical initiative and scientific standardization to perfect it. Consider these points:

Now with two blues, one red and one yellow, any design normally requiring six, seven or more colours can be printed with perfect registration and complete colour value.

Now precision presses, conditioned papers, tested inks and varnishes, combine to produce a standard of label *quality* unheard of before LITHESK.

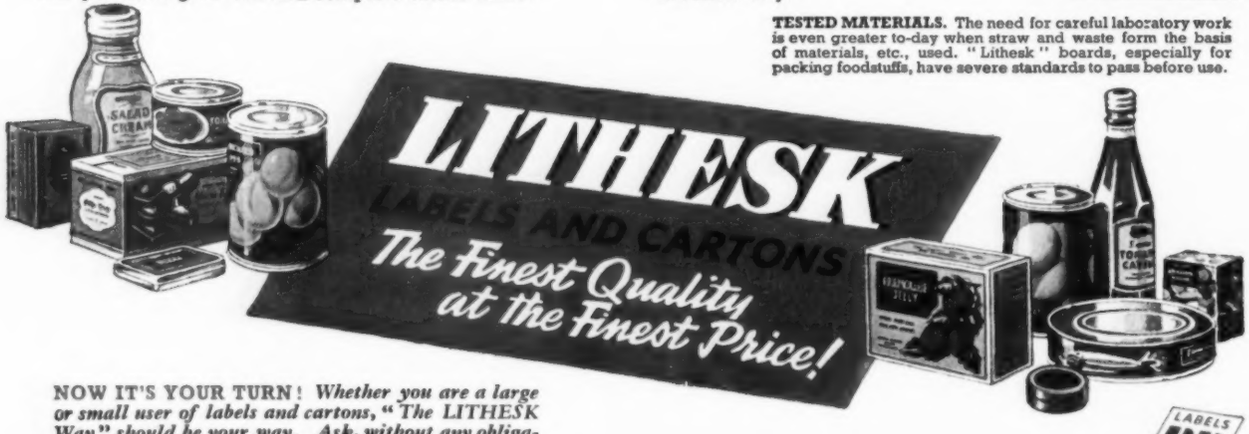
Now micro-accurate cutters give perfection to thousandths of an inch on every label, ensuring trouble-free operation on automatic machines, eliminating wastage, cutting labour costs.

Now the LITHESK "revolving stock" plan keeps you supplied with labels always fresh and crisp — cuts out your need to maintain stocks — gives you keener prices whether your need is for 25-thousand or 25-million.

Canners, bottlers, packers of every kind of goods the world over now buy "the LITHESK way" because they have found that it gives them finer labels — *packs that get displays* — reduces to an absolute minimum capital investment and overhead and at the same time cuts costs beyond belief.

Yours is the need — meet it 'the LITHESK way."

TESTED MATERIALS. The need for careful laboratory work is even greater to-day when straw and waste form the basis of materials, etc., used. "Lithesk" boards, especially for packing foodstuffs, have severe standards to pass before use.



NOW IT'S YOUR TURN! *Whether you are a large or small user of labels and cartons, "The LITHESK Way" should be your way. Ask, without any obligation, for samples and constructive recommendations.*

LABELS BIR CARTONS

BROWN & RAWCLIFFE LTD. *Lithographers* AINTREE, LIVERPOOL.
TELEPHONE: AINTREE 3461

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. . . . and just as this charming girl has confidence in the swim she is about to enjoy, so we have perfect confidence in drawing your attention to our

CEMENT PRODOR

Acid-resisting Cement. This is an absolutely reliable cement that can be used with excellent results in any situation where acid liquors or fumes are present. It has been used EXCLUSIVELY for many years by the leading industrialists throughout the World and has been proved time and time again to be

THE BEST ACID-PROOF CEMENT OBTAINABLE

Cement Prodor is particularly suitable for use in the construction of Acid Tanks, Acid Process Tanks, Neutralising Sumps, Walls, Towers, Floors, Chimney Linings, etc. It can also be used as a cement for bedding in any form of lining tile for acid liquor constructions.

Send for full particulars—it will be a few minutes well spent.

COUPON F.M.

To Prodorite Limited, Eagle Works, Wednesbury

Please send us particulars of PATENT ACID-RESISTING CEMENT PRODOR.

Name of Firm.....

Address.....

.....

For the attention of Mr......

EAGLE WORKS
WEDNESBURY
Staffs
Phone : WEDnesbury 0284
(Private Branch Exchange)

PRODORITE LTD.

Artillery House
Artillery Row
LONDON, S.W.1
Phone : ABBey 1547 & 1548

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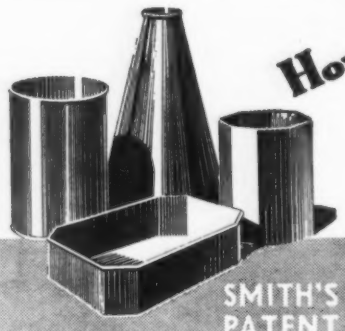


How much Time lost in Soldering these?

Hand soldering is wasteful both in time and material; this compact machine takes out the guesswork and regularises the output up to 175 cans per hour with unskilled labour. If this is your need, write to us for leaflet and quotation.

SMITH'S PATENT **SOLDER BATH**

Patent No. 312882

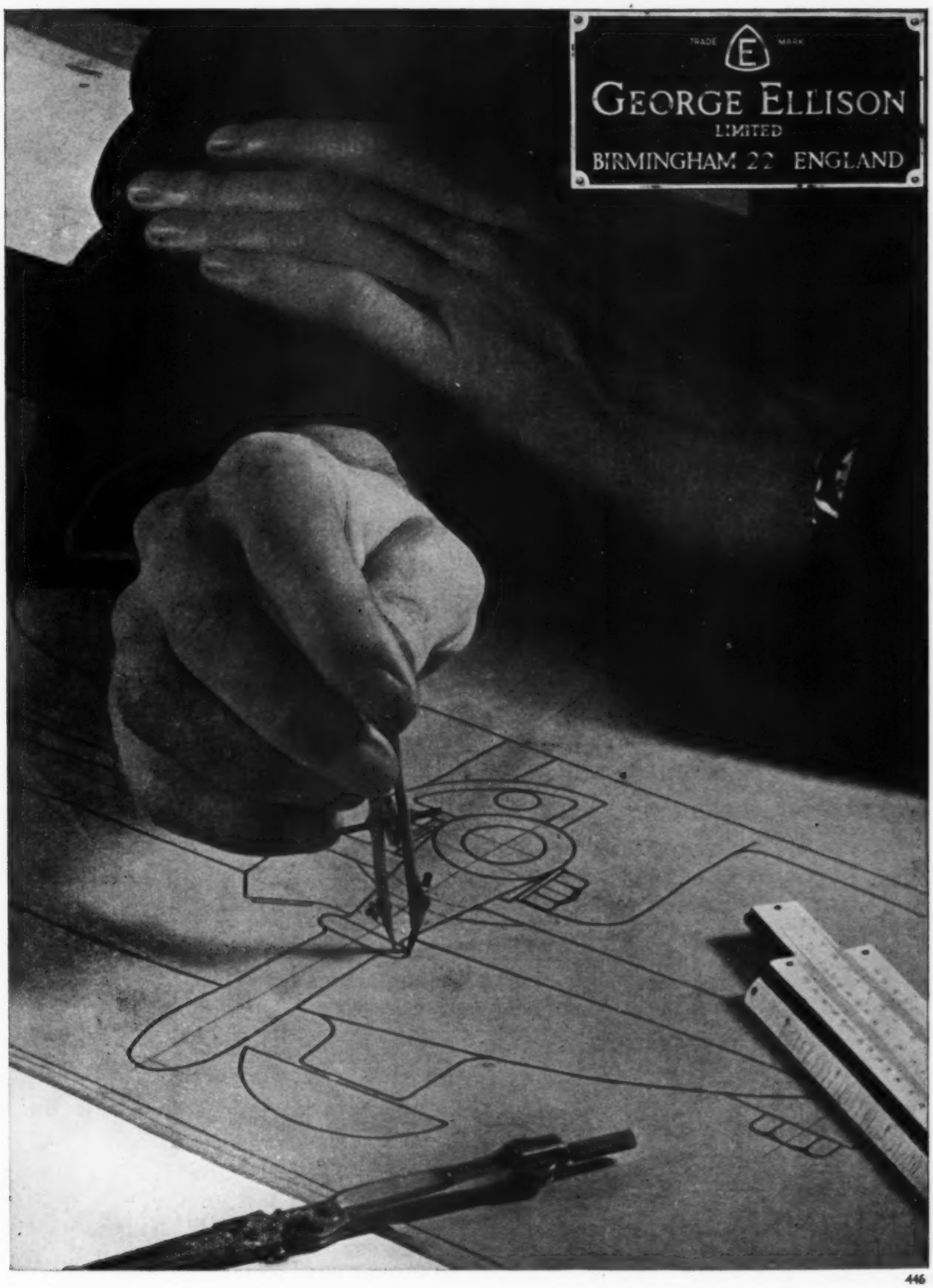
Made by

Over 200 machines covering all requirements in the economical production of tin boxes are listed in our catalogues. May we send details?

MOON BROTHERS LTD.
BEAUFORT ROAD
BIRKENHEAD, CHES.

A regular saving on irregular work.

dm 668



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HARMLESS COLOURS

FOR FOODSTUFFS

Despite the enormously increased demand for these pure colours we have, so far, kept our regular customers supplied.

Delay in delivery of certain products has been unavoidable, but our friends have shown their understanding of our difficulties and we welcome this opportunity of thanking them.

All orders sent us will receive our careful attention as in the past and be despatched in rotation as colours become available.

USACERT COLOURS
certified by the U.S.A. authorities are necessary for your exports to the U.S.A.

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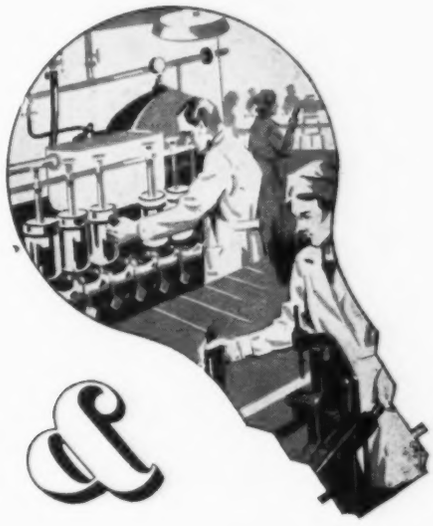

FOOD & LIGHT

In days of stress, the great industries reveal themselves as the very pillars of our national economy. On those responsible for the manufacture, preparation and distribution of food, a very heavy burden is laid. That is why we ask all engaged in this industry to consider whether their *lighting* is helping them all it can—for *good light* is also a national necessity. Ekco Light Planning and Ekco Lamps have done a good job for the nation in many industries—perhaps they can help you too. Write to Lamp Sales Dept., Ekco Works, Southend-on-Sea.

EKCO

LIGHT PLANNING

TINPLATES & BLACKPLATES

The Baldwin range includes a branded Tinplate for every purpose. These Tinplates are STANDARD brands regularly used in all parts of the world for every kind of canning and deep stamping work.

As the original makers of Open Hearth Siemens Basic Steel with complete control of materials from iron ore to finished product, Baldwins are able to offer exceptional advantages to users of Tinplate.

Strictly competitive prices for all grades and qualities quoted on request.

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Limited

Registered and Head Office : P.O. Box 255, 6 Broadway, Westminster, London, S.W.1
Telephone : Abbey 1853. 'Grams : "Balwinza, Rand, London."
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South Wales Branch and Collieries Office : 45 Wind Street, Swansea
'Phone : Swansea 4941 (8 lines). 'Grams : "Baldwins, Swansea."
London Sales Office : P.O. Box 255, 6 Broadway, Westminster
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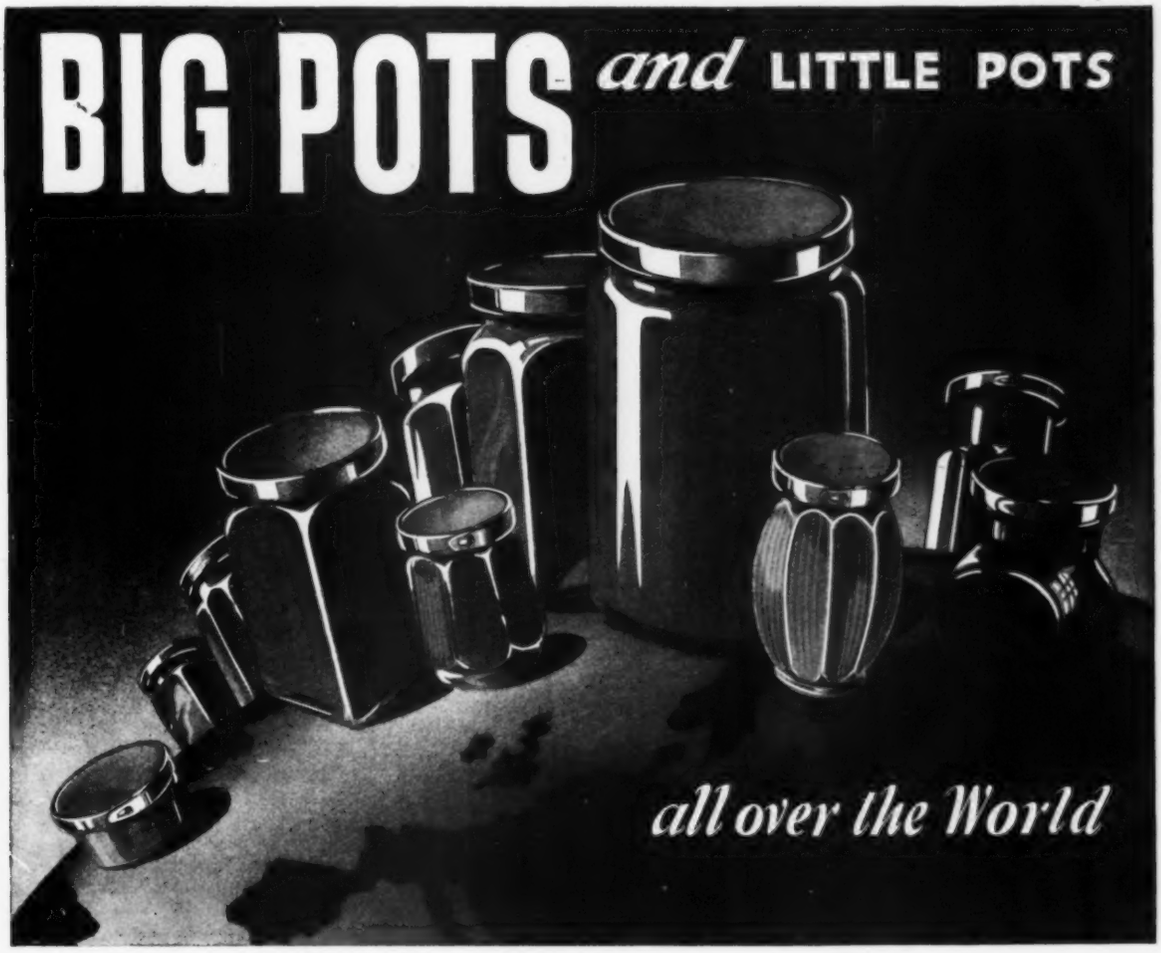

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Capping problems of to-day with war limitation of supplies, present difficulties which our manufacturing resources and research departments may solve for you, for Big Pots or Little Pots—WALLIS stands for an organisation which solves your capping problem.

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Tin Stamping
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MANUFACTURERS OF TIN CAPS FOR PRESERVES, etc.,
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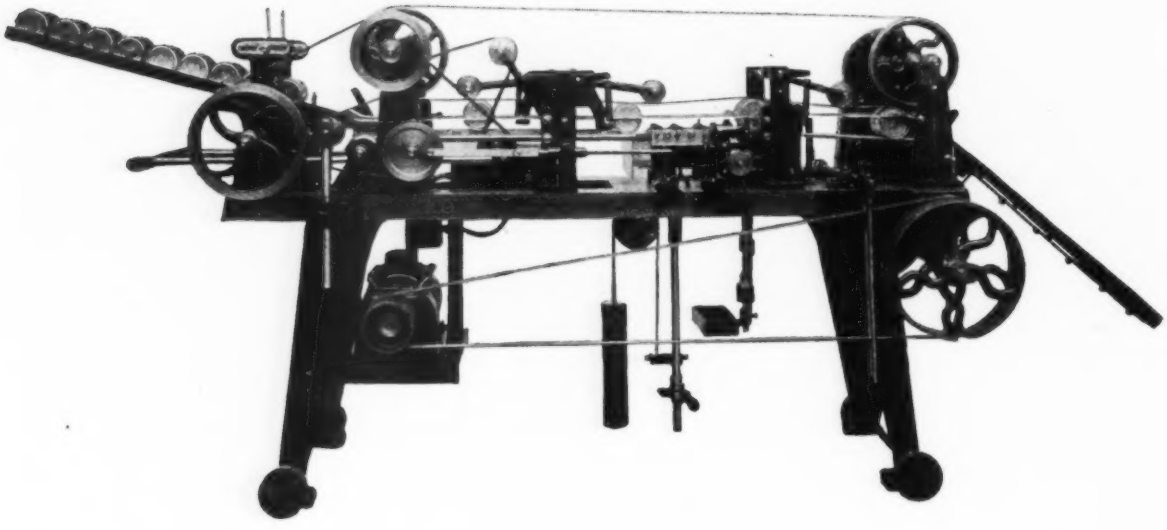


★ We are manufacturers, not agents, and have been manufacturing for the past 30 years. Buy from the makers and gain the advantage of their experience.

One Beth Labeller is adjustable to all round sizes. Will label any round can or package, with or without lids, at any desired speed without skilled operator and with very small power. The Paste does not touch the tin, therefore no rust is formed and brightly coloured labels are kept bright.
No waiting to dry.
Fitted with Castors, if desired.
Complete with or without electric motor-drive.

THE BETH LABEL & WRAPPER MACHINES LIMITED

DAGMAR ROAD, LONDON, N.4 Telephone: ARCHWAY 2933
Telegrams: "Labwrap, Finspark, London"

TROUBLE-FREE PIPELINES

DEPEND ON FIRST-RATE FITTINGS

Above is illustrated the Crane Plug Type Disc Valve. It stands up to prolonged wear under steam working pressure up to 250 lbs. and temperature up to 500° Fahrenheit.

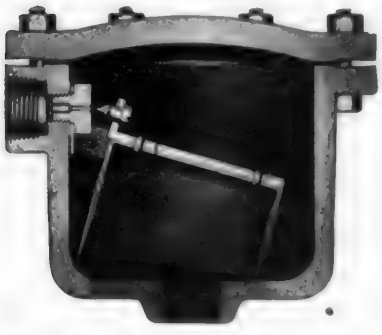
CRANE Valves and Fittings constitute a comprehensive range of pipeline equipment, embodying British Standards. At all times the greatest care is exercised in the choice of materials from which they are made and at every stage of their manufacture. And "Crane" have never delayed in introducing into their products features which are an improvement on past methods—the taper to taper thread, for instance.

Crane Heating Equipment, too, enjoys a reputation for unsurpassed scientific design and efficiency.

Taper Thread Banded Tees.

The Gate Valve shown above is one of a range selected to meet all general requirements. Robustly constructed, the design embodies all the valuable results of prolonged research into Gate Valve uses.

Taper Thread Long Sweep Pitcher Tees.



High Capacity Inverted Open Float Steam Trap for removal of condensate from piping and steam-heated equipment.

Cast Iron Flanged Bend.

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VALVES, FITTINGS AND FABRICATED PIPEWORK EQUIPMENT

CRANE LTD 45/51 LEMAN STREET, LONDON, E.1
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PROTEX

A Vegetable Extract with high Amino Acid content. Manufactured by Fredk. Boehm Ltd.

As a base, incorporated in foodstuffs, PROTEX has been accepted as a standard ingredient by the leading food manufacturers and is valued chiefly for its power of enhancing the characteristic flavour of almost any food preparation.

YEATEX

A Yeast Extract Manufactured by the Trent Yeast Extract Co. Ltd., from Brewers' Yeast. Rich in Vitamin B. A most highly concentrated food, easily digested with the highest nutritional and health value. Possessing a pleasant aroma and flavour.

Sales Offices:

FREDK. BOEHM LTD.

ROWANHURST, GROVE ROAD, BEACONSFIELD, BUCKS

Telephone: Beaconsfield 378

CROMPTON WAR DIARY

JANUARY, 1940

1st Proclamation signed for the call-up of nearly 2,000,000 men.

4th Goering given complete control of German economics.

5th Hore-Belisha, War Minister, resigns. Succeeded by Oliver Stanley.

13th ← *R.A.F. drop leaflets over Prague and Vienna.*

14th All B.E.F. leave suspended due to tension in Holland and Belgium.

23rd 20 m.p.h. speed limit in black-out announced.

24th Vatican reveals details of German atrocities in Poland and Czechoslovakia.

27th Mr. Churchill announces plans for absorbing 1,000,000 women into industry.

30th Hitler speaks. Again threatens to let us see what war is like.

JANUARY 1941

4th Bardia captured with six generals and 25,000 prisoners.

9th Revolt begins among Abyssinians.

10th Greeks capture Klisura.

11th Second big fire blitz on London beaten by fire watchers.

13th Heavy raid on Plymouth

14th German dive bombers attack British fleet in Mediterranean. Three ships damaged. 12 planes down.

15th Fight fire order to everyone between sixteen and sixty.

22nd Tobruk falls. 25,000 prisoners.

23rd ← *Haile Selassie back in Abyssinia.*

30th General Metaxas, Premier of Greece, dies.

The making of history

When the lights again appear in the streets of Britain they will be like symbols of the return of electricity's full benefits to the human race. Electricity will have a significant part in the post-war plan. And the Crompton Parkinson organisation with 60 years' specialised experience in the development and manufacture of electrical equipment will be able to give a ready response to the Nation's needs.

CROMPTON PARKINSON

Electrical Equipment

Two "Broadbent" 54" Belt-Driven Centrifugals with Lift-out, Tip-over Baskets and Overhead Runway

CENTRIFUGALS FOR FOODSTUFFS

STANDARD DESIGNS IN A VARIETY OF SIZES FOR STEAM, BELT, MOTOR OR DIRECT ELECTRIC DRIVE.

FIXED OR **LIFT-OUT** BASKETS, WITH STAINLESS STEEL OR MONEL FITMENTS THROUGHOUT.

ALSO
SPECIAL DESIGNS FOR SECRET PROCESSES.

Ask for Catalogue No. 3936

BROADBENT CENTRIFUGALS

ARE USED IN THE MANUFACTURE
OF MOST OF THE

WORLD-FAMOUS FOOD PRODUCTS

MAXIMUM FILTRATION, CLEANLINESS
AND
MECHANICAL RELIABILITY GUARANTEED

Literature and Technical Information on request

CUSTOMERS' PRODUCTS TESTED FREE OF CHARGE

FOR
DRYING, FILTERING, DE-LIQUORING OR PRECIPITATING ALL KINDS OF FOOD PRODUCTS DURING PROCESSING STAGES.

USED FOR
FILTERING FROZEN EGGS
COFFEE ESSENCE GROUNDS
BREAD FOR SAUSAGES
POTATO CRISPS & PULPS
MEAT EXTRACTS
INFANT FOODS
RECLAIMING SOLIDS FROM LIQUOR
RECLAIMING OIL FROM OFFALS
RECOVERING CRYSTALS
Etc., Etc.

Almost Unlimited Uses

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LONDON LEICESTER MANCHESTER
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Representatives in almost every country throughout the World

TELEGRAMS :
BROADBENT
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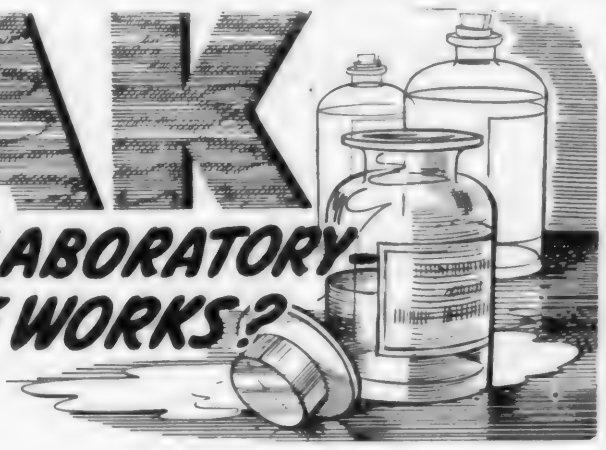
TEAK



IS USED IN THE LABORATORY— WHY NOT IN THE WORKS?

There are adequate supplies available, and those qualities in Teak which are so highly appreciated for laboratory fittings and floors are also the very ones which make it an ideal timber for wooden vats and tanks and benches because . . .

Teak resists acids better,

Teak resists alkalies better,

Teak resists moisture better,

Teak therefore lasts longer.

Teak is not a costly timber, and the war-time advance in price is less than with most other woods. Naturally, for outsize specifications, the price increases as it does with every timber grown and sold, but, for medium-sized planks averaging say, 10 ft. by 10 ins. by 3½ ins., Teak is an economical timber. If in any doubt as to what sizes to order, consult your Timber Merchant.

Teak is Tectona Grandis. Other timbers have been miscalled "Teak," but they are not Tectona Grandis and have not the properties of true Teak. Burma Teak is true Teak. See the B.S.I. Nomenclature of Hardwoods, 1939.

BURMA TEAK

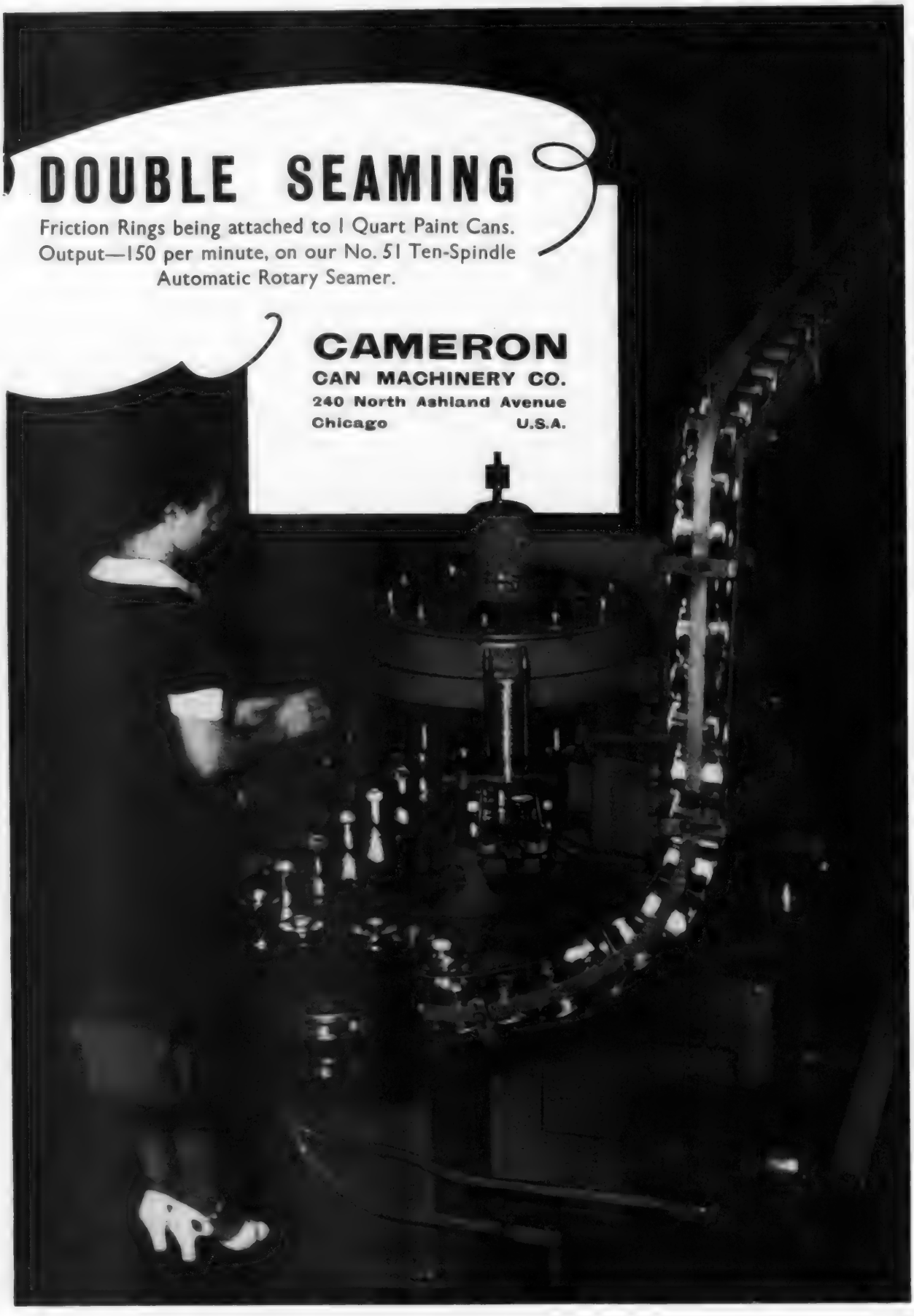
Withstands the Acid Test!

BURMA TEAK SHIPPERS, 4 Crosby Square, London, E.C.3

DOUBLE SEAMING

Friction Rings being attached to 1 Quart Paint Cans.
Output—150 per minute, on our No. 51 Ten-Spindle
Automatic Rotary Seamer.

CAMERON
CAN MACHINERY CO.
240 North Ashland Avenue
Chicago U.S.A.



EFFICIENCY
BRILLIANCE
ECONOMY
– all maintained with
MAZDA
THE NATION'S LIGHT
B T-H
"NEVER KNEW SUCH A 'LIGHT' HEARTED LOT O' BLOKES AS WE ARE SINCE THEY PUT THESE MAZDA FLUORESCENT LAMPS IN. TALK ABOUT TURNING NIGHT INTO DAY! WHY THEY TURNS WORK INTO PLAY, AS WELL!"
Perhaps the most important result of B T H Light-Conditioning is its effect upon the spirits of the worker. In preparing plans for the lighting of industrial premises, B T H Engineers give first place to psychological factors, because they know that the kind of lighting that ministers most to the cheerfulness, comfort and well-being of the workers will also have the best effect on production.
Make use of the services of BTH Lighting Engineers. You will be under no obligation.
MAZDA FLUORESCENT Lamps with MAZDALUX Equipment
Five feet of purest daylight
BTH for all Electrical Plant and Equipment
THE BRITISH THOMSON-HOUSTON CO., LTD., CROWN HOUSE, ALDWYCH, LONDON, W.C.2

Mazda Lamps, Mazdalux Equipment of excellent design and the expert advice and planning service of B T H Lighting Engineers are the constituent elements which make B T H Light-Conditioning of such enormous value in increasing the productivity of modern industry.

Write or telephone for a copy of the B T H Light-Conditioning Code. It epitomises the recommendations of the Fifth Report of the Departmental Committee on Lighting in Factories.

M. 3926 *BTH for all Electrical Plant and Equipment*

THE BRITISH THOMSON-HOUSTON CO., LTD.
CROWN HOUSE, ALDWYCH, LONDON, W.C.2.

G.E.C.

ELECTRICAL EQUIPMENT

FOR FOOD FACTORIES

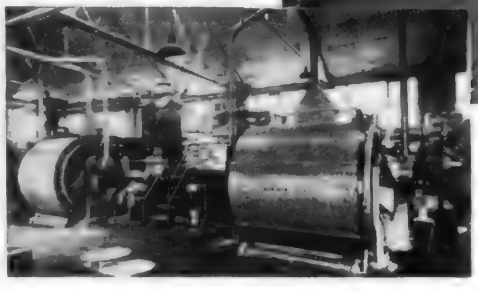
EVERYTHING ELECTRICAL

for

POWER ..... •
LIGHTING ..... •
HEATING ..... •
VENTILATION •

with complete assurance of efficient and economical operation.

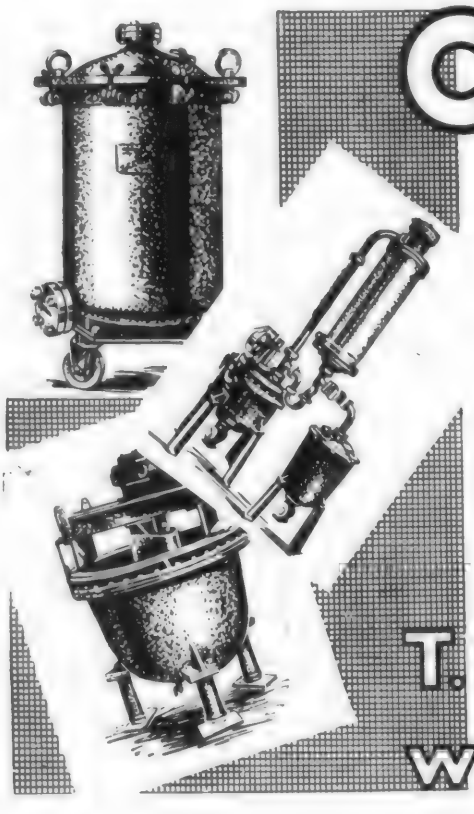
Two grinders and a small blender driven by G.E.C. motors—15 h.p., 6 h.p. and 4½ h.p. respectively.



Two blenders, 1-ton and 1½ tons capacity, driven by 5 h.p. (450 r.p.m.) and 6 h.p. (970 r.p.m.) slip-ring motors respectively.

Two views in a well-known food factory where a large quantity of G.E.C. equipment is employed.

Advt. of The General Electric Co. Ltd. Head Office: Magnet House, Kingsway, London, W.C 2.



CLARK'S CHEMICAL EQUIPMENT

CONSTRUCTED BY CRAFTSMEN

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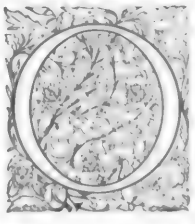

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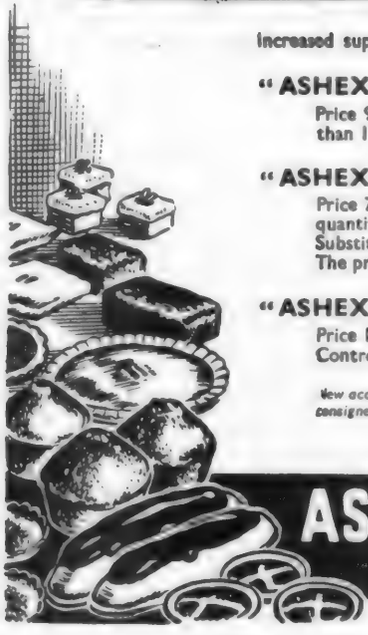

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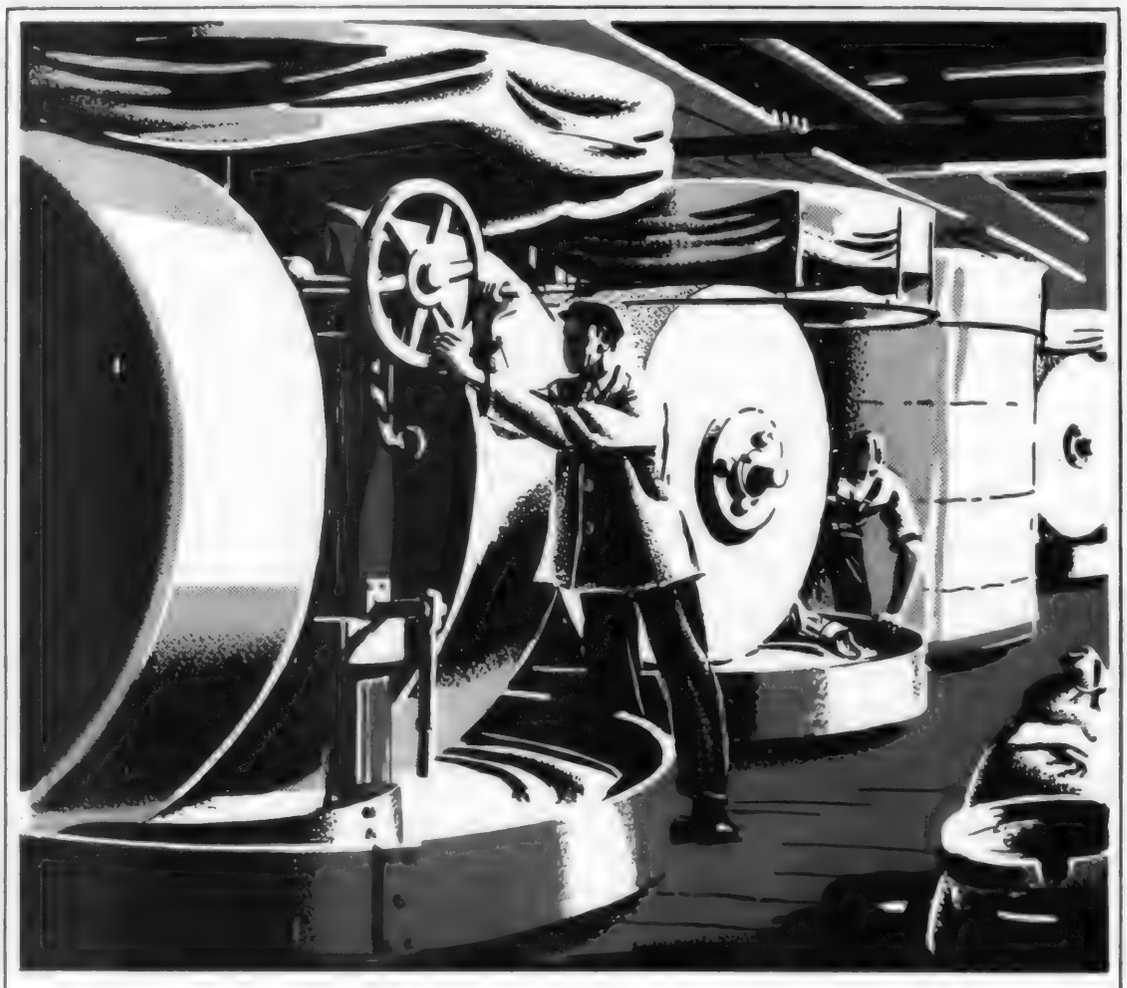

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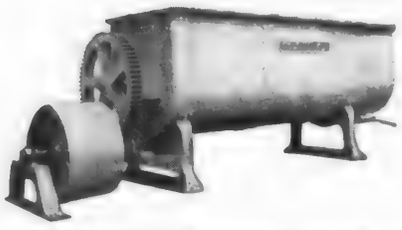
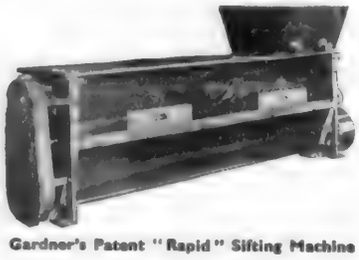
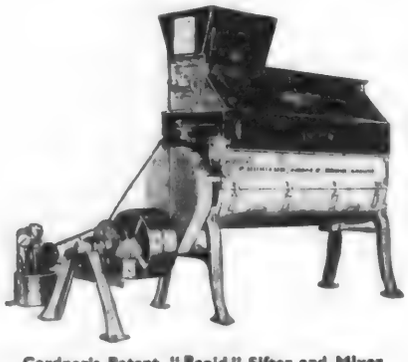


Gardner's Patent "Rapid" Mixer with Patent Agitator



Gardner's Patent "Rapid" Sifting Machine



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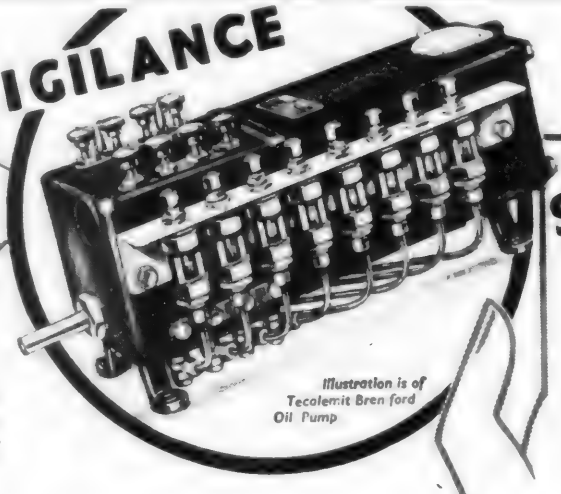

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★ *Pepys later became Secretary to the Navy, and is now recognized to have had great influence on its development.*

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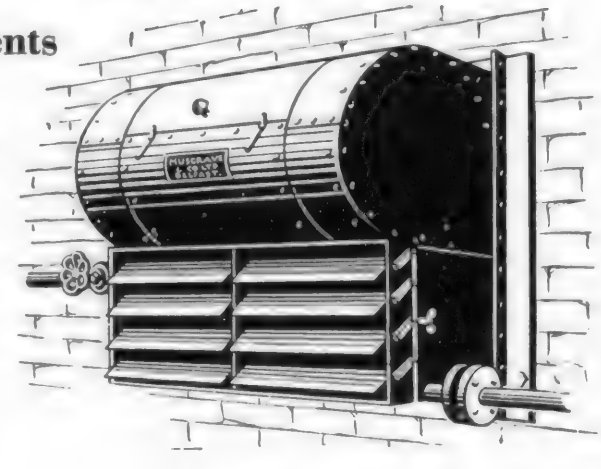

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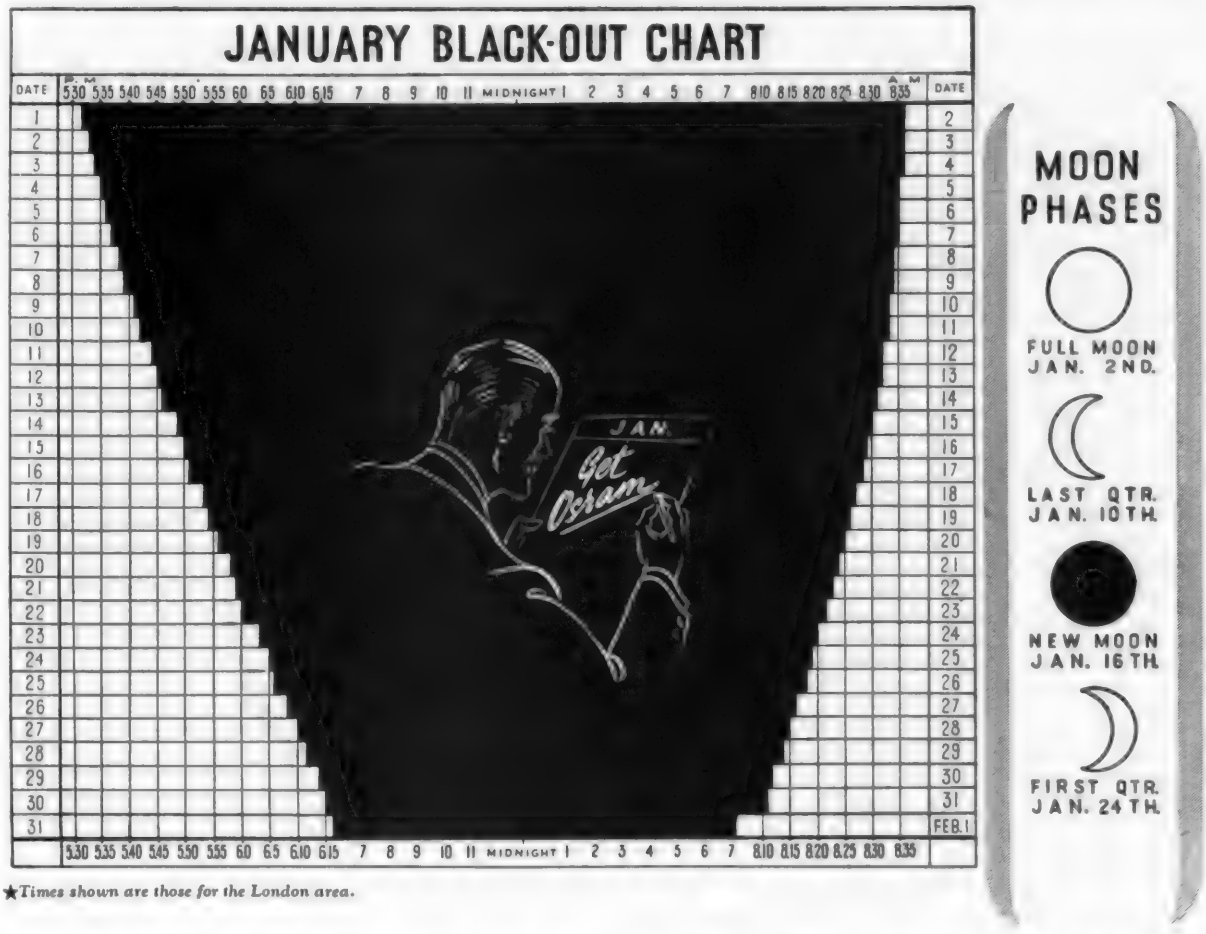
JANUARY BLACK-OUT CHART
DATE
5.30 5.35 5.40 5.45 5.50 5.55 6.0 6.5 6.10 6.15 7 8 9 10 11 MIDNIGHT 1 2 3 4 5 6 7 8.10 8.15 8.20 8.25 8.30 8.35
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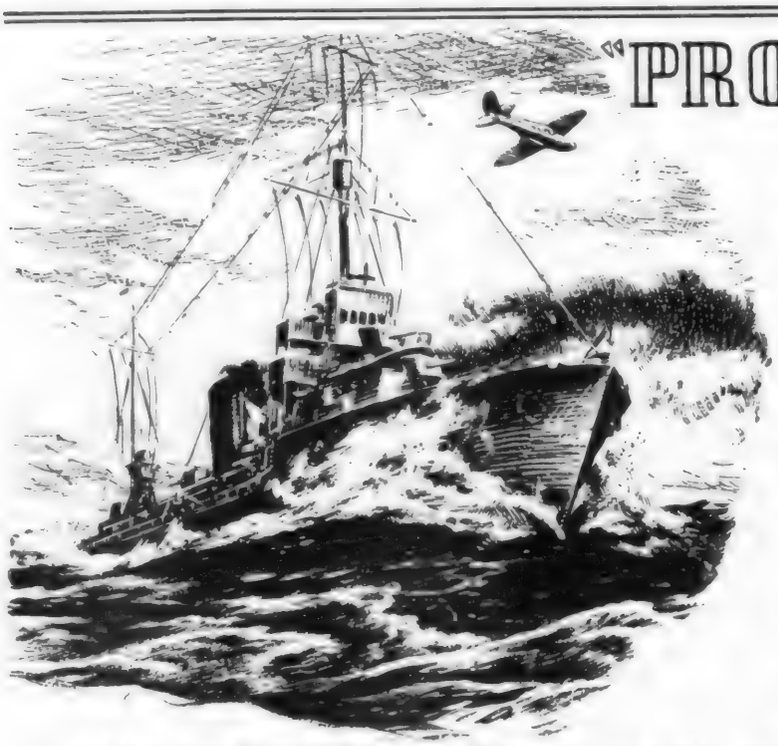

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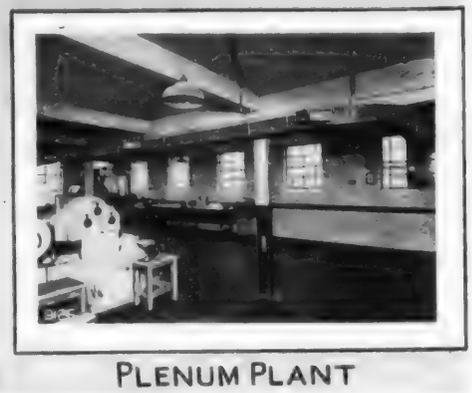

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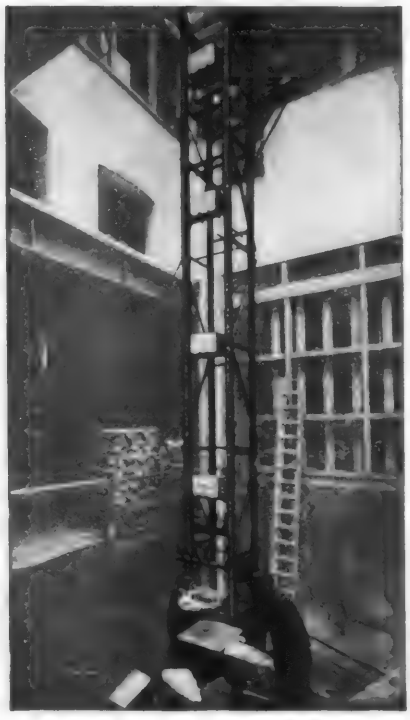

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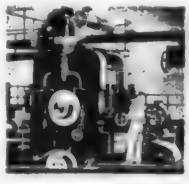

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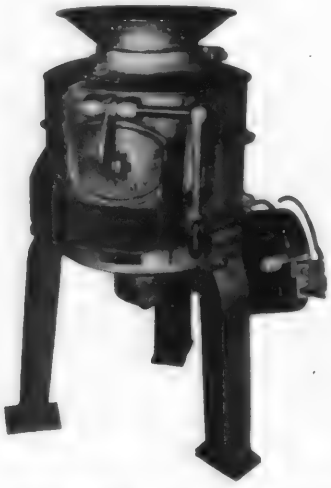

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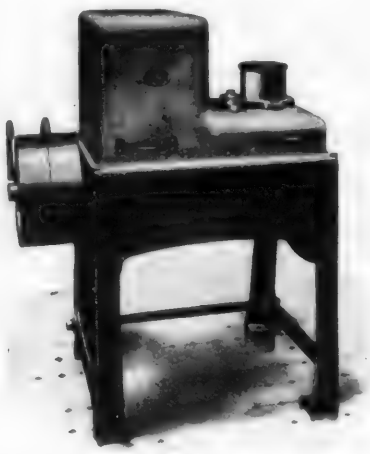

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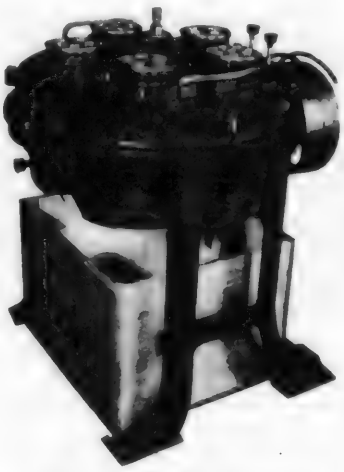

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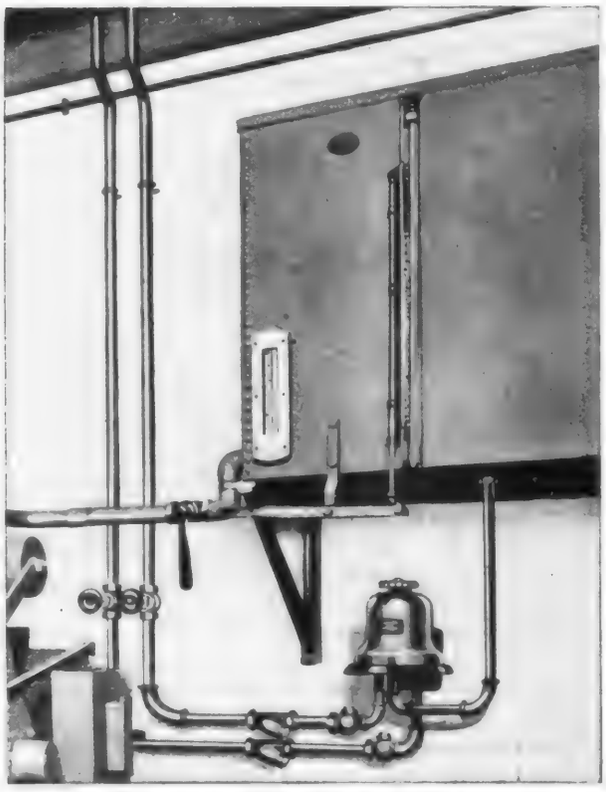

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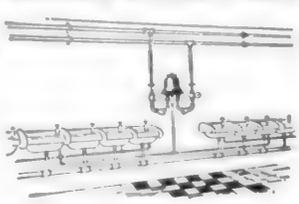

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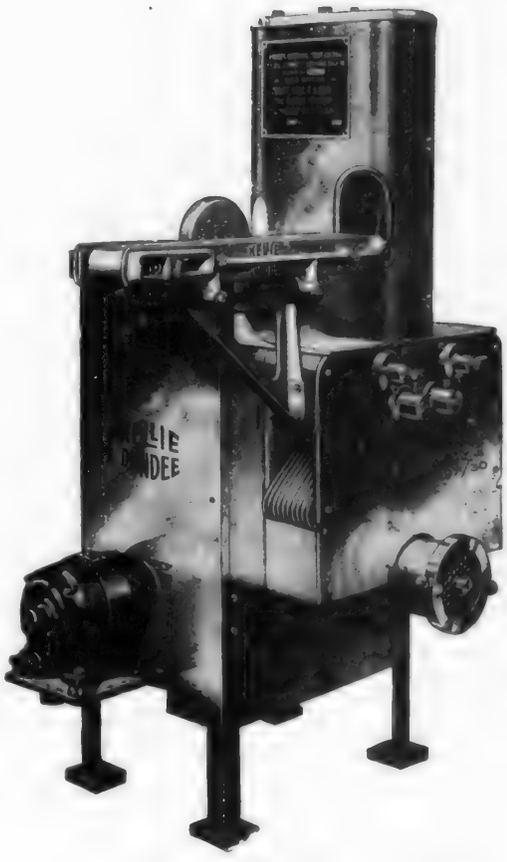

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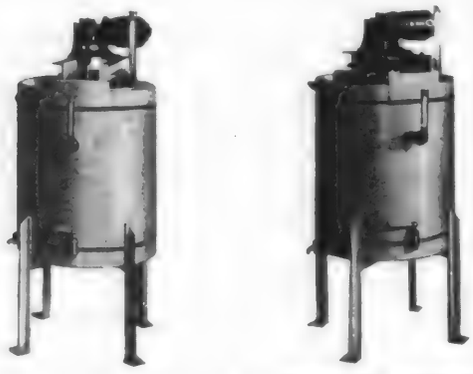

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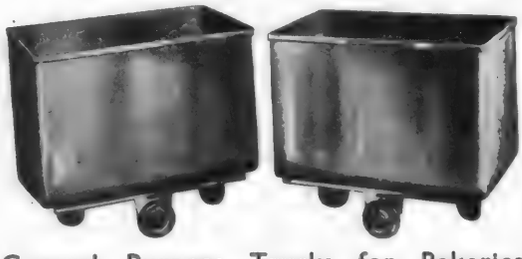

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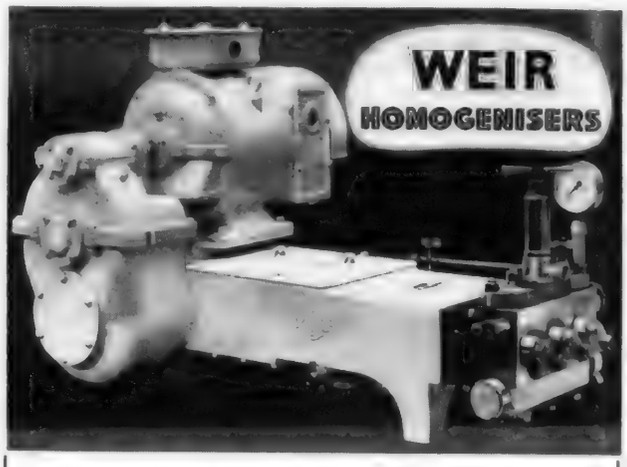

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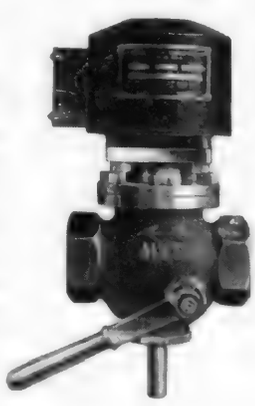

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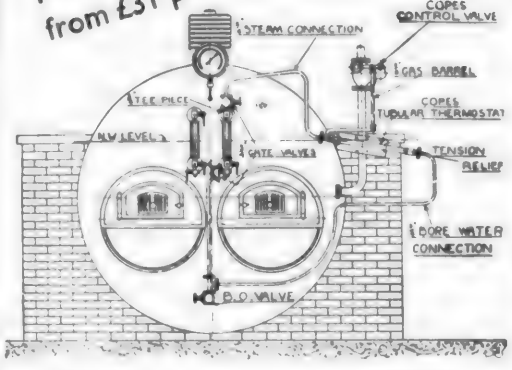

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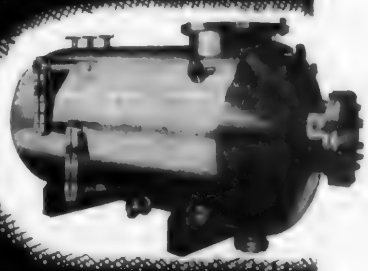

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FOOD MANUFACTURE

VOLUME XVII. No. 1 JANUARY 1, 1942

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photograph. or drawings when possible.

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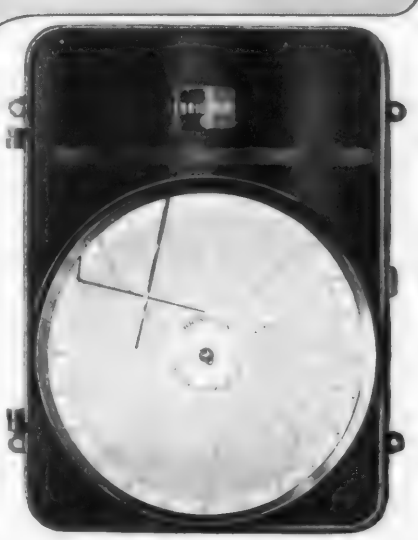

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FOOD MANUFACTURE

Vol. XVII, No. 1 January 1, 1942

1942

THERE IS no standing still. Even as I pause
The steep path shifts and I slip back apace:
Movement was safety; by the journey laws
No help is given, no safe abiding-place;
No idling in the pathway hard and slow;
I must go forward, or must backward go!

I will go up, then, though the limbs may tire,
And though the path be doubtful and unseen,
Better with the last effort to expire
Than lose the toil and struggle that have been,
And have the morning strength, the upward strain,
The distance conquered, in the end made vain.

Ah, blessed law! for rest is tempting sweet,
And we would all lie down if so we might;
And few would struggle on with bleeding feet;
And few would ever gain the higher height,
Except for the stern law which bids us know
We must go forward, or must backward go.

"Tenderising" Meat

The tough steak has ranked with the mother-in-law as a time-honoured joke for home and music-hall consumption, but in vain to the cutlery has been ascribed the blame. To achieve tenderness of his meat, prehistoric man is said to have made a practice of hanging it. This allows the protein-digesting enzyme to act, but it takes time. Roughly considered, there is a race between enzyme and bacteria, as alongside the first works the second, which is detrimental to the meat. Refrigeration inhibits the reaction of the bacteria but also retards enzyme action. It also tends to form a dry film on the surface of the meat which is darker in colour and of inferior palatability and which may have to be trimmed off by the butcher.

Judging from the information contained in the September number of *Meat* (U.S.A.), which is almost completely devoted to it, the "Tenderay" process is now well established in the United States. "Fundamentally it consists of accelerating enzymic activity by holding the carcass at 60° F. for three days and then stopping enzyme action by refrigeration." The action of bacteria during these three days is prevented by the use of ultra-violet radiation of a definitely controlled type and wave-length, and this has been produced by the Sterilamp. The third part of the Tenderay process, the second preservative operation, is to adjust the humidity of the air of the hanging chamber. If the air be supplied with water vapour to between 85 and 90 per cent. of the carrying capacity of the meat the loss of water by evaporation becomes a minimum or even disappears. This process might well be filed against the time when luscious rump or porterhouse steaks reappear on our menus.

Germinated Grain

From time to time short references to the effect of germinating peas have appeared in the technical Press. A certain amount of work has been done in this direction but the general public is not aware of it.

Some interesting details are given in the annual report of the Punjab Public Health Department regarding the value of germinated grain, which is merely grain kept moist until it begins to sprout. The report describes the measures adopted to check the development of deficiency diseases by the introduction of germinated grain as a prophylactic against diseases due to a lack of vitamins A, B, and C.

At one time nearly a quarter of a million people were eating this protective food regularly. Its use was immediately followed by an immediate and dramatic disappearance of scurvy and a definite reduction in cases of night blindness, though the grain was not in the same degree a specific for this condition as for scurvy. Three of the many merits of germinated grain as a preventive of food deficiency diseases are given in the report as (i) grain in some shape or form is available everywhere, (ii) the procedure of producing germination is simple, and (iii) germinated grain contains vitamins A, B, and particularly C, in abundance.

Increasing the Native Salmon Yield

The high food value of fresh and canned salmon would render a very profitable return for any efforts to increase the yield of native British salmon, whose main handicap at present is river pollution. A correspondent writes that he considers it possible to increase considerably the yield of British salmon by giving more attention to control of river pollution, and to restocking many derelict salmon rivers, even to the Thames, providing it is with spring fish which can go up-river at spring flood when the water is at its highest and the pollution least concentrated, and even if the pollution is too bad for fish going down-stream in autumn, they could be netted at favourable points and transported past the worst parts in barges.

The Ballisdore River restocking experiment in Ireland (*Salmon and Trout Magazine*, 102, 1941) is cited as an example, and notable salmon anglers like Mr. Brian Bellews support the theory that the Thames can, under certain conditions, be restocked. Indeed, it was recently reported to the Merseyside Naturalists' Association that a 25-lb. salmon was taken out of the Mersey—the most polluted of rivers—by the keeper of Hale Lighthouse, 15 miles up-river, last autumn and boiled and eaten, while two more, gashed by ships' propellers, were found on a river bank at the time, and another of 15 lbs. was taken at that spot a few years before, these being Dee salmon that came up-river on a rising tide.

THE EDITOR SENDS SEASONAL GREETINGS TO ALL READERS

Cheap Refrigerated Rail Transport

Of considerable interest to the food industry is a leading article in *Engineering*, November 28. In the course of a detailed discussion on the problems of refrigerated rail transport, an account of the work of the Research Department of the L.M.S. Railway in developing an absorption type of refrigerating apparatus suitable for fitting to insulated vehicles of fairly small size is described.

The agents employed are ammonia and calcium chloride, and the action is intermittent, the ammonia being dissociated from the calcium chloride by heat and condensed by external cooling pipes, whence it passes to an evaporator inside the van. The refrigerating operation is inaugurated by thermostatically controlled valves which substitute cold water for the heating steam. The consequent re-absorption of ammonia by the calcium chloride produces rapid evaporation of the liquid ammonia in the evaporator coils, and the load is thereby refrigerated. Underlying the whole project has been the endeavour to produce a refrigerator van of general utility demanding a minimum of maintenance and actuated at almost negligible cost by low-pressure steam from the carriage-warming supply normally fitted to all locomotives. These are the factors upon which the commercial success of the new type of van will devolve, in competition with mechanical compressor-type machines or existing well-tried methods of refrigeration by water ice or solid carbon dioxide. Nor is its eventual adoption on a large scale entirely a matter of costs: it depends also on the expansion of trade in refrigerated commodities. And here, perhaps, is the major justification for a venture of this sort, having so many points of novelty both in principle and in detail of design. Cheap refrigerated rail transport, by filling a present need, will tend to create new traffics, in new commodities and between new centres of trade, and, incidentally, the public will be served by being supplied with food products in better condition. Despite its restricted possibilities in this country, few will deny the value of improved refrigeration in rail transport; and, from this standpoint alone, the efforts of all concerned with the new vehicle deserve every encouragement.

Tinned or Canned

This is the title of an article in *The Weekly Review*, December 4, 1941. The hope is (ironically?) expressed that "those about to set up house on H.P. lines assisted by a tin opener and a corkscrew will be adequately impressed" by a letter by Dr. J. Molyneux Hamil in *The Times*, in which figures the following phrase, "If canned foods are properly sterilised during manufacture and the cans remain hermetically sealed, bacterial toxicity cannot develop in them merely as a result of lapse of time."

The writer of the article suggests that "the 'if' must not be taken too seriously because we have no means of finding out".

We fail to follow what this really means and we are put into a state of worse mental confusion by a quotation from the letter of another doctor—Dr. Bernard Varlett. He is said to have written: "With regard to canned foods much nonsense is being talked. Many people find that a mixture of brass filings and coal dust makes an admirable substitute for pepper. Further, if all food were canned it could be distributed evenly among the population. I see no reason why there should not be a canning *and clothing* factory in every district to which everybody could come with their coupons (thus obliterating the small shopkeeper and other impedimenta). Besides, could we not live in flats near these rationalised food centres and enjoy carefree weekends in country excursions and organised games?" We can only agree with the doctor that with regard to canned foods much nonsense is being talked.

Government Advertising

It is safe to say that there has been no period in history like the present one in which the inhabitants of this country have been instructed by advertisement in the way they should go. Perhaps the greatest efforts in this direction have been in the matter of education in food matters. Although the very intricacy of the subject has rendered results difficult of attainment, there is no doubt but that the man-in-the-street has absorbed something about what is good for him. There probably are diverse opinions as to the value of the daily exhibition of the drawing of "Dr. Carrot" in the newspapers. The value of repetition is generally acknowledged as an instrument of suggestion, but there are some people who think that a leaf might be taken from the patent medicine advertisers' book and that an occasional description of the dire effect of *not* eating carrots might be useful. That this is not entirely an unorthodox opinion is proved by the success of patent medicine advertising.

Is all this instruction going to cease after the war? This question was put by Mr. G. J. Redgrove, Public Relations Officer, Ministry of Food, to a meeting of the Publicity Club. "What is going to happen," he asked, "when the lights of peace come again? Is the banner of Government advertising going to come down with the barrage balloons?" He did not think so, if Publicity made up its mind that "a Government which has been so thoroughly sold on advertising, stays sold, and we shall continue to be told not only about choice of food but Post Office service, savings, education, and income tax".

The Utilisation of Surplus Coffee

Some further interesting details are to hand (*Ind. Eng. Chem. News Edit.*, 1941, 19, 877) of the utilisation of the coffee plant in Brazil for the manufacture of the new plastic Caffelite. A five-story semi-commercial plant has been erected in São Paulo for the production of Caffelite, caffeine and coffee oil to deal with a portion of the huge surplus of Brazilian coffee.

In fourteen of the twenty-two states there are known to be some 3,000,000,000 coffee trees, which in 1938 accounted for 77 per cent. of the world's output of coffee. For the eighteen years from 1918-1938 the surplus amounted to some 1,000,000,000 lbs. of coffee. The extraction of caffeine, tannins or oils would not have been economic, but the manufacture of Caffelite provides for use of the bean, cherry or even the tree. The caffeine and oil separated in the course of the manufacture are true by-products, while the main product is a cheap, satisfactory moulding powder, the properties of which can be controlled and varied in a number of ways. The caffeine and oil are removed by extraction and the meal mixed with water and, usually, an acid catalyst and autoclaved at about 300° F. It is next washed, neutralised and dried under vacuum, and after the addition of dyes, mould lubricants, etc., the thermosetting powder is ready for use either for extrusion or pressure moulding.

The reactions in the autoclave probably consist of the production of furfural and similar bodies from the pentosans liberated by the hydrolysis of the hemicelluloses followed by condensation of the furfural with polyhydric tannins and the combination of the aldehydes with the protein present.

The oil has obvious applications, such as the production of glycerol and fatty acids and as a substitute for palm oil. It also contains several of the vitamin compounds, and the germ oil is relatively rich in tocopherol. Antirachitic properties have been claimed for the oil.

The caffeine should find ready outlets at the present time in the pharmaceutical field and for use in beverages. The

tannins include from 1 to 6 per cent. of chlorogenic acid (a pepside of quinic and caffeic acids), which can be hydrolysed into its constituent acids, and the caffeic acid can be converted into dihydroxystyrene. The alkaloid trigonelline is also present and by the action of hydrochloric acid and heat this can be made to yield nicotinic acid. The unsaponifiable fraction of the oil has also considerable interest. Other substances separated include a pectin-like material, a fraction which after processing gives an emulsifying agent conferring unusual stability on emulsions, and a material with powerful anti-oxidant properties.

Moisture in Sweet Manufacture

In any manufacturing operation moisture can appear to cause trouble by its simple condensation from humid air on to relatively cooler surfaces. Many production troubles in sweet manufacturing fall in this category. But where sugar is involved, particularly the invert sugars resulting from high-temperature cooking, moisture can appear to interfere with production operations by the very hygroscopic nature of sugar itself, even though conditions may not be favourable for pure mechanical moisture condensation. By this hygroscopic action the invert sugars absorb moisture whenever the water vapour pressure of the sugar is less than the water vapour pressure of the surrounding atmosphere. The higher the temperature at which the sugar is cooked in sweet making, the higher the percentage of invert sugar in the goods and the greater is the tendency for a wet sticky surface to develop on sweets exposed to unconditioned air. For example, it is not uncommon in carmel hardening rooms for the sweet to accumulate as much as a quarter of an inch of semi-dissolved material on the top surface during a period of high dew point. Even if this hygroscopic action of invert sugars is not sufficient to spoil the batch, it may result in enough stickiness to clog production machinery, slow down production cycles, necessitate extra drying operations, or result in the development of "sugar bloom" on the goods.

"Sugar bloom" is the result of moisture either absorbed by or condensed on the product. It is nothing but the crystallisation of uncombined sugars on the surface of sweets due to its solution by moisture and subsequent deposition when the moisture is evaporated away.

Independent Dehumidification

An account of the way in which American confectionery manufacturers are tackling the problem of moisture by independent dehumidification—air-conditioning equipment designed to regulate moisture conditions within the plant *separately from* and *independent of* other air-conditioning equipment intended primarily for cooling purposes—is contained in an article in *The Manufacturing Confectioner*, U.S.A.

So far as is known, the idea was applied for the first time less than three years ago by a New England sweet maker, and started a trend towards production improvements by bringing air humidity as well as temperature under the thumb of the plant superintendent. Independent dehumidification is to-day serving all types of producers of confectionery in the U.S.A., who have the choice of several types of dehumidification equipment.

One of these is of the solid adsorption type, wherein silica gel or activated alumina desiccates air passing through it, and is subsequently "reactivated" for further use by being heated with hot air from an integral gas-fired unit. Thus, the solid adsorbent withdraws moisture from the air to be conditioned and later discharges it to heated air which goes up the flue with the products of combustion. Such units may be either of the rotary-continuous or intermittent-tray type. It is conceivable that other types of independent dehumidification equipment, such as the Kathabar lithium-chloride liquid absorption unit, or calcium-chloride driers, might be adapted. The important thing is to have plant humidity control which is not merely an incidental concomitant to refrigeration or other cooling systems—plant humidity control which is available for use at any time irrespective of whether the cooling action of refrigeration air conditioning is needed or not.

The writer believes that the sweet industry needs *independent* control of moisture and temperature—so that the plant superintendent can conveniently adjust both important variables to the special and changing requirements of the goods, the department and the weather of the moment.

An Improvement in Ice-salt Air Cooling

The National Research Council of Canada reports as follows: Ice and ice-salt mixtures are still used to a considerable extent for preserving foodstuffs, and the maintenance of the desired temperature with the required uniformity throughout the space is frequently difficult. The use of distributed cooling coils under thermostatic control in conjunction with ice cooling would overcome these difficulties if a method capable of transferring sufficient heat between the space and the ice bunker, without forced circulation, could be devised. The end-bunker type of railway refrigerator car is an example of such an application. Last year some preliminary tests were reported on the ability of an "ammonia link", or an enclosed system of piping partly filled with ammonia, to transfer heat over small temperature differences. The tests described in the last report indicated that although appreciable heat transfer occurred, it was less than was expected. Further tests, conducted with the cold coil at a lower level, showed that where the water from the melting ice was allowed to accumulate in the bunker, the quantity of heat transferred was increased several fold. It appears, therefore, that wherever a temperature difference of 30° F. or more occurs between the temperature of the cooling medium and that required in the space, this indirect method of cooling could be applied. Such a system could be adapted to reduce spatial temperature variations and provide thermostatic control where solid refrigerants are used.

Yeast as Synthetiser of Food Material

With further reference to the possibility of employing yeasts to provide food materials from semi-synthetic mediums (Food Manufacture, December, 1941), it is of interest to note that Otto Rahn attributes a very high place to yeast as a converter of materials. He states (*Growth*, vol. 4, 1940, pp. 77-80) that the "maximal efficiency of energy utilisation in growth is of the same magnitude in the vertebrates, insects and bacteria" studied by him. Thus, one Calorie of food supplied to pigs produced 36 to 78 milligrams of solids, or 0·2 to 0·4 Calorie of useful matter—a food-producing efficiency of 20 to 40 per cent.; trout similarly produced 35 to 68 milligrams or 18 to 31 per cent.; cockroaches were more efficient at about 34 per cent., and mould-fungi were still better at about 60 per cent., while several species of bacteria converted into solids amounts of from 13 to 81 per cent. of the energy-producing material with which they had been supplied. The carefully selected strain of yeast used by Rahn, when supplied with one Calorie of food, produced from 135 to 250 milligrams of solids, equal to 60 to 110 per cent. of the energy supplied. Without having further details we cannot quite believe in the odd 10 per cent., but it seems probable that yeast is an especially efficient converter of raw material into something that might be used as human food.

THE MILLING INDUSTRY

PROGRESS IN 1941

A. J. AMOS, Ph.D., B.Sc., F.I.C.

IT is very gratifying and encouraging to find that at the end of two years of war—and a war characterised by an intensive U-boat campaign designed to bring about our capitulation by starvation—there is no limitation of supplies of our staple food—bread. In fact, our supply of wheat, which is, of course, the prime factor governing our output of bread, has been so well maintained that we have recently been able to send considerable quantities of this cereal to our Russian allies. An abundance of wheat does not, of course, in itself guarantee a plentiful supply of bread; this latter position can be realised only if milling capacity remains adequate. This aspect of the problem has been attended to by a body known as Re-Commissioned Mills, Ltd. (formerly called the Purchase Finance Co., Ltd.), which has restarted a number of modern inland mills which had been closed down for some time, and thus compensated for any impairment of capacity resulting from "blitzes" on the large ports.

Wheats Available

The allocation of imported wheats to millers has remained in the hands of the officially appointed Port Area Grain Committees and, in general, the scheme has worked well. By far the majority of wheat imported has been No. 1 and No. 2 grade Manitoba, the remainder being mainly Australian or Argentine (Rosafe Plate). The preponderance of Manitoba wheat has necessitated the use of a high proportion of this strong wheat in millers' grists, with the result that flours have exhibited considerably greater strength and water absorption than was usual in peace-time, when the Manitoba content of the grist was much lower. The increased strength in the flours has, however, been accompanied by well-balanced properties and bakers have had no difficulty in dealing with their doughs.

When the new crop English wheat became freely available in the early autumn there was, as had been anticipated, a definite drop in the strength and water absorption of most flours. Even so, the breadmaking quality of the average flour remained above the peace-time standard.

Much of the English wheat of this harvest has been very wet; moisture figures in the region of 18 to 20 per cent. are by no means uncommon. Fortunately, however, the excessive dampness has not, in general, been accompanied by sprout, and very few samples have exhibited unduly high enzymic activity.

White Flour

During the period under review an order was issued requiring millers to raise their extraction to 75 per cent., an increase of 3 per cent. over the previous official figure of 72 per cent. This change was naturally accompanied by some loss of brightness in the appearance of the flour, but the effect upon flour "colour" was actually very slight and the longer extraction flour is still a white flour of good colour. Actually, millers should have no difficulty in obtaining a length of 75 per cent. without undue deterioration in colour with present-day blends, since these contain a high proportion of plump Manitoba which yields a high proportion of flour. The position would have been quite different, of course, had millers been obliged to employ considerable proportions of a wheat such as thin Plate wheat or lower grade Manitoba such as, for example, No. 4 grade. The colours and ash contents of individual flours naturally vary, since they are influenced by the condition of the milling plant, the arrangement of the system, the conditioning of the wheat, etc., but a good average figure for the ash content at the present time is 0·51 per cent., which is not greatly in excess of the average figure for the 72 per cent. flour, which was 0·48 per cent.

The increased extraction has, however, led to a considerable rise in the natural B_1 content of white flour. This result was not unexpected in view of the findings of Copping and Roscoe (*Biochem. J.*, **30**, 1, 879) that 72 per cent. was a critical extraction as far as B_1 content was concerned. The average B_1 content of the war-time 72 per cent. flour was 0·30 I.U. per gm., whereas the average figure at the present extraction is 0·45 I.U. per gm., an increase of 50 per cent.

Dr. A. J. Amos.

In Eire, the wheat position has become so acute that the previously enforced extraction of 75 per cent. was raised early this year to 95 per cent. The product obtained at this extraction is, of course, no longer a white flour but is a wheatmeal—in fact, essentially what is known in the industry as a wholemeal. This regulation applies to all flour, and hence the bread produced by the soda-bread system, as well as yeast bread, now consists of wheatmeal loaves. It has been suggested that it may become necessary for the wheat supplies in Eire to be eked out still further by enforcing the incorporation in flour of 10 to 15 per cent. barley meal, but as yet this scheme has not been put into practice.

Fortification

In the review of the milling industry during 1940, which the present author wrote for this journal (FOOD MANUFACTURE, January, 1941), the opinion was expressed that the Government's scheme for the fortification of flour could not be put into effect before the summer of 1941. This prognostication proved to be correct, and it was not until a few months ago that the addition of synthetic aneurin to flour was commenced, and even then the practice was, and still is, restricted to a few mills in one area of the country.

These mills are supplied with a concentrate of aneurin, which needs to be added at the rate of 1 oz. per sack of 280 lb. of flour. This concentrate is prepared at a central factory by adding to a thin cream of flour and water an aqueous solution of aneurin and then spray-drying the mixture. The proportions of the ingredients are so chosen that there is one part of aneurin in 140 parts of the dried product.

Frequent determinations of B_1 content are made upon the flour from each mill at which fortification is being performed. A panel of cereal laboratories has been appointed by the Ministry of Food to effect this control, and they have just completed and will shortly publish an agreed report upon the modifications of the thiochrome method which they employ and which they have found to yield consistent results with white flour.

The original proposal of the Government was that fortified flour should contain in addition to the added vitamin B_1 a quota of calcium carbonate in the form of creta præparata, but, so far, no calcium-enriched flour has been produced. The criticisms which have been raised against the advisability of this step may have some bearing upon the delay in the inauguration of the scheme, but it is undoubtedly explained also by the techno-

logical difficulties which the process presents. The physical properties of creta præparata are such that it cannot be fed into flour continuously at a definite and controllable rate by means of the feeders which are in use in the milling industry. The addition to flour of calcium in this form will need to await the appearance of a mixer designed specially to deal with this material.

National 85 Per Cent. Wheatmeal

The Ministry of Food have sponsored a National Wheatmeal loaf, and have conducted a campaign designed to popularise this type of bread. The Accessory Food Factors Committee of the Lister Institute and the Medical Research Council have issued two Memoranda upon this matter, and in the second, which appeared early this year (*Lancet*, November 31, 1941), they indicated the lines upon which the 85 per cent. Wheatmeal should be manufactured in the mill. The instructions were designed to furnish a product giving an ash content of about 0·9 per cent., a fibre content of about 0·8 per cent. and a B_1 content greater than 1 I.U. per gm. The National 85 per cent. Wheatmeals which have been produced throughout the country have not by any means, however, been a standard product. They have exhibited considerable variation in ash content and in vitamin B_1 potency, as is well illustrated by analytical data reported by Kent-Jones and Amos (*Milling*, November 29, 1941). Despite the efforts of the Ministry of Food to convince the public that by adopting this National Wheatmeal loaf they can serve their health and, at the same time, give expression to their patriotism, this type of bread has not gained any great popularity, and there are indications that an appreciable proportion of the consumption of National Wheatmeal has been effected at the expense not of white bread but of other forms of meal bread.

Appreciation of the considerable calcium-immobilising power of wheatmeals owing to their phytic acid contents led to an amendment of the original scheme for enrichment of flour with calcium. It is now recommended that, whereas white flour shall be enriched with 7 oz. of calcium carbonate per sack, 14 oz. per sack shall be added to National 85 per cent. Wheatmeal.

Fortified White Flour v. National 85 Per Cent. Wheatmeal

The seeming inability of the Ministry of Food to adopt a settled policy concerning bread, which has been made so apparent by the alienation of their affection from their long-heralded child the fortified white loaf and its transference to their more recent but more wayward offspring the 85 per cent. Wheatmeal loaf, has led to the revival in a new guise of the long contested white bread versus brown bread controversy. The issue now being debated by those associated with the milling industry, by nutritionists and by agriculturists is the relative nutritional and economic merits of the two policies—fortified white bread or National 85 per cent. Wheatmeal bread.

It has long been accepted that the only really significant nutritional deficiency exhibited by white flour as compared with wholemeal is its low B_1 content, and when this is made good—as it is in the fortified white loaf—the main argument of the brown bread adherent is no longer applicable. The official case for National Wheatmeal has, however, been built up around another corner stone—namely, economy of shipping space. At the present time, this factor must obviously be accorded full consideration when the relative merits of the two policies are being assessed. Another important point to which full weight must be given is the reduction in the supply of animal feeding stuffs which would be occasioned by the substitution of Wheatmeal for white flour in the national diet, and its adverse effect upon the milk supply. In other words, any gain of nutrients resulting from the change must not be accepted as a net gain, but must be offset by the nutrients lost by the reduction in milk or other animal products which would naturally follow the diversion of much of the wheatfeed to human food.

An admirable survey and detailed analysis of the problem by Wright (*J.S.C.I.*, August 23, 1941) and a critique of this paper by Bacharach (*J.S.C.I.*, November 8, 1941), who corrects certain of the figures and extends the analysis of the problem to include certain other nutrients, leave no doubt that, whereas the replacement of white flour by 85 per cent. wheatmeal would lead to an increase in the intake of iron, nicotinic acid and vitamin B_1, it would entail a definite loss to the nation of calories, protein, calcium, riboflavin and vitamins A, C and D. There would, of course, be no gain in B_1 were the substitution effected after fortification of white flour had been extended to all mills. It is true that the nutrients lost by raising the extraction to 85 per cent. could be largely offset by increased importation of processed milk, meat or cheese (Bacharach, *loc. cit.*), but such a policy would be indefensible if, as the Ministry of Food advertisements suggest, the object behind the campaign to popularise National Wheatmeal is the saving of shipping space.

The present author finds in the evidence presented in these two papers striking support for the opinion he expressed a few months ago (FOOD MANUFACTURE, September, 1941)—namely, that the most economic and advantageous method of utilising our wheat supplies under existing circumstances is to produce flour of about 75 per cent. extraction, to fortify this with vitamin B_1, and to employ the wheat by-products for the maintenance of the supply of animal products and particularly of milk.

Reported Scientific Work

The majority of the reported cereal investigations available to chemists in this country have been undertaken in America. A considerable proportion of this work has centred around subjects which have attracted attention during the last two or three years, such as, for example, the influence of various flour constituents upon baking quality, the mode of action of flour improvers, physical methods for the assessment of baking quality and studies of the amylases of cereals. In addition, however, there have appeared a number of papers dealing with the determination of vitamins in cereal products and the significance of the results thus obtained. Most attention has naturally been accorded to vitamin B_1, but studies have also been made into the nicotinic acid, riboflavin and vitamin E contents of cereals and their products.

The Government's scheme for the fortification of white flour has naturally led to a quickening of interest in the nutritive properties of flour and bread, and several important papers dealing with this subject have been published in this country in recent months.

The paper by Wright and the review of this by Bacharach mentioned above contained much informative data on the nutritional properties of flour of different extractions and the breads made from them.

The Food Group of the Society of Chemical Industry recently held a meeting dealing with cereals as food, at which four very useful papers were presented. The first of these to appear in print—the contribution of Kent-Jones and Bacharach (*J.S.C.I.*, November 22)—presents a very helpful review of the general and the particular value of bread in the diet.

Macrae, Bacon, Hutchinson and McDougall (*J.S.C.I.*, October 4) reported the comparative digestibilities of white and wholemeal breads as determined by experiments with human subjects. Their results confirmed those of earlier investigators inasmuch as the energy, nitrogen and fibre of white bread were absorbed to a greater extent than were the same constituents of the brown bread.

Copping has discussed the B_2 vitamins contained in flours of different degrees of extraction, while Dawson and Martin (*J.S.C.I.*, September, 1941) have investigated the proportion of the vitamin B_1 in bread which is destroyed in baking.

A paper of particular importance is that of Margaret Wright (*B.M.J.*, November 15), which gives the results of comparative feeding tests with bread from fortified white (75 per cent.) flour and from National 85 per cent. Wheatmeal. Chick had suggested previously (*Lancet*, October 6, 1940) that fortified white flour fell short of wholemeal in nutritive value, and she ascribed the inferiority to lack of B_2 vitamins. Wright drew attention to certain sources of error in Chick's work and modified her own technique accordingly. She was quite unable to substantiate Chick's findings and her experiments indicated that there was nothing to choose between the nutritive values of fortified white bread and of National 85 per cent. Wheatmeal bread. In her final experiment, two series of rats were fed with a mixed diet corresponding to those of Orr's groups I and II, but suitably amended so as to meet the present-day restrictions imposed by rationing and scarcity of certain commodities. The bread portion (35 per cent. of the total diet) fed to one series of rats consisted of fortified white bread, whereas the other series received their bread in the form of National 85 per cent. Wheatmeal. In this carefully conducted test there was no difference between the two series of rats, and all of them thrived quite satisfactorily.

FOOD ANALYSIS

PROGRESS IN 1941

D. W. GROVER, B.Sc., A.I.C.

AS would be expected, the publication of analytical methods in this country has decreased during 1941. There is a great deal of interest to review, however, much of it of American origin.

General

The temperature for ashing biological materials continues to be the subject of research. If much magnesium is present, considerable losses can occur below red heat,[1] for whereas potassium and calcium carbonates commence to decompose at about 700° and 600° C. respectively, the magnesium carbonate loses weight markedly between 300° and 400° C. Above the latter temperature the oxide is stable. Nicholls and White[2] have commenced a study of the proper temperatures for igniting analytical precipitates. Their method, depending on vapour pressure determination, has so far been applied only to calcium carbonate to test the apparatus, and lead sulphate. Results for the former agree with previous data. Decomposition of the lead salt occurs above 730° C.

Of particular interest at the moment is a procedure for detecting glass particles in powdered foodstuffs.[3] The powders are dispersed in a heavy solvent such as chloroform or carbon tetrachloride. The organic material is thereby floated away from particles of glass, sand, etc. These latter are treated with acid and examined microscopically. Glass particles have sharp edges and are transparent, contrasting with rounded and opaque sand particles. Glass is also differentiated by examining under polarised light and by melting on platinum at red heat in 1 to 2 minutes.

Milk and Milk Products

A critical review of the significance of the various tests applied to liquid milk has been made by J. G. Davis.[4] The relations between the results of the tests, their underlying physical and chemical causes, and accompanying apparent faults, etc., are tabulated. Emphasis is placed on the rapidity of obtaining results. A comparison of the methylene blue and resazurin tests for bacterial contamination has been made by Thomas and Davies.[5] The latter test has advantages for the detection of thermophilic flora. Milk failing the methylene blue test had low leucocyte counts and high mean bacterial counts. The reverse was true for milks failing the resazurin test.

Neutralised milk or milk products may be recognised by the high alkalinity of the ash. A study of the water-soluble and insoluble fractions of their alkalinity has revealed the unexpected result that the addition of water-soluble alkali to neutralise the milk does not cause a corresponding increase in the water-soluble alkalinity.[6] The total alkalinity is increased by the expected amount, but part of this increase is found in the water-insoluble ash. The same division occurs if the milk is neutralised with lime.

The total solids in skim milk of various stages of concentration may be calculated from the equation.[7]

$$y = -21{\cdot}2817 + 690{\cdot}8972x - 1097{\cdot}2389x^2$$

where y = total solids per cent.
x = refractive index − 1·3.

If decimal figures were any indication of accuracy, great precision would be expected of this relationship. Actually, however, the error is ±0·2 per cent. When fat is present, as in whole milk and cream, the refractive index cannot be accurately determined, owing to dispersion of light.

Egg Products

A valuable addition to the methods available for the determination of the egg content of foodstuffs has been made by Haenni.[8] The determination of lipoid phosphorus, which is a usual means of arriving at egg content, has proved unreliable for two main reasons. There is a large allowance to be made for the lipoid phosphorus in any cereals present, and the figure changes progressively on storage. The method now proposed is based on the determination of sterols. Whole egg solids contain on the average 2·11 per cent. of sterol, and the deviation from this figure is not great. Wheat, on the other hand, contains only 0·024 per cent. of sterols. A method for determining the sterols has been worked out in some detail for macaroni and products which do not contain other ingredients likely to interfere. A greater general utility will result when the sterol content of a larger variety of possible ingredients has been established. The sterol figure for prepared foods does not change on storage.

The analytical procedure is to isolate the unsaponifiable ether-soluble fraction in the usual way, and from this to precipitate the sterols as their dibromides. The dibromides are collected and the bromine estimated iodometrically.

Meat and Fish Products

Many meat products are very complex mixtures of various meats, cereals, soya flour, etc., and their analysis presents considerable difficulties. One constituent which is unlikely to be used in this country at the moment is skim-milk powder. Methods for determining the amount in meat products have been described in two papers. The isoelectric point of casein is 4·6, and that of most meat proteins 5·3. This fact is made use of in determining casein in the presence of meat.[9] By heating the material at *p*H 5·7, casein alone of the proteins remains in solution, and may be estimated by well-known methods. Eighty per cent. of the casein is recovered in this way. Meat products free from milk powder have an apparent casein content of 0·1 to 0·2 per cent. Like methods dependent on lactose determinations, this is not applicable to spoiled products. Methods previously proposed for determining milk powder in sausages by means of calcium and lactose estimations have been described in greater detail.[10] The calcium (as CaO) in skim milk varies from 1·72 to 1·97 per cent., while that in sausages and meat products free from milk powder averages about 0·024 per cent. Tripe is liable to contain high proportions of calcium if it has been cooked in alkaline hard water. The accuracy with which the milk content may be calculated from the calcium figure is about ±0·5 per cent. The lactose content is another obvious means for arriving at the proportions of dried milk. The method adopted depends on selective fermentation by washed yeast, which does not affect the lactose. The accuracy in this case is ±0·2 per cent. of skim milk.

A slight modification in previously described gravimetric methods for starch determinations in sausages, etc., is proposed as being more satisfactory in the presence of soya flour and other material containing hemicellulose.[11] The sample is boiled with 8 per cent. alcoholic potash, filtered, and the insoluble material, after washing, treated with 5·7N hydrochloric acid. This brings the starch into solution. Insoluble material is separated by filtration and the starch precipitated by alcohol.

Identification of different meats in the presence of each other is achieved by Italian workers.[12, 13] They prepare specific precipitins for the proteins of various meats. These reactions are useful only when the proteins have not been denatured by heat. In cooked products some success may be had by treating the material with pancreatic enzymes before testing with the precipitins.

Other new analytical methods of particular application to meat and fish products are for the determination of glycogen,[14] nitrite[15] and the polarographic analysis of pickling brines.[16] Glycogen is extracted from oysters by digestion with alkali and precipitated with alcohol. It is then dissolved in water, hydrolysed by acid, and the resulting dextrose determined by its reducing power. The diazotisation reaction, as usual, is the basis of the determination of nitrite. A new coupling reagent.

N-(1-naphthyl) ethylenediamine, is claimed to give more permanent colours in less time than α-naphthylamine. Another departure from established methods is that the nitrous acid is caused to diazotise sulphanilamide instead of the more usual sulphanilic acid. The advantage of this change lies in the fact that the reaction between nitrous acid and sulphanilamide is stoichiometric in the presence of excess of either. As a consequence, matching standards may be made up from pure sulphanilamide instead of the less convenient sodium nitrite.

No new technique is made use of by Ingram, who applies standard polarographic methods to the analysis of pickling brines. By this means figures are obtained for chloride, nitrate, nitrite (more than 20 p.p.m.) and total proteins (approximate only).

The presence of tyrosine is claimed by Bradley and Bailey[17] to be a delicate indication of spoilage in fish. They propose a colorimetric test.

Fruit and Fruit Products

No outstanding contributions to the analysis of these products have been published. The A.O.A.C. have combined well-known methods to form a tentative procedure for the microbiological examination of canned fruits, etc.[18] Of interest is a test for organisms capable of proliferating when the acid fruit is mixed with less acid material.

Peel oil in citrus juices may give rise to objectionable off-flavours, and methods for its estimation are consequently of some interest. Grapefruit oil in the juice is volatile in steam, and from 74 to 79 per cent. of its volume can be collected from the distillate.[19] Hand-reaming fruit gives juice containing only 0·007 per cent. of oil, whereas some mechanical extractors give a juice containing as much as 0·1 per cent.

Fats and Oils

The analysis of fats continues to attract considerable attention, examination for oxidative spoilage alone being the subject of many papers.

Dastur and Lea[20] have made a critical examination of some alternatives which have been proposed to the peroxide value. On carrying out the latter test, some of the iodine liberated by the peroxide may be reabsorbed, particularly by highly unsaturated oils. This error may be kept within reasonable limits by reducing the quantity of fat taken when the peroxide value is high. A procedure, proposed by Gang and Rumpel, to estimate the potassium iodide oxidised instead of the iodine liberated is found to have no advantages over the simpler peroxide determination. The presence of ketones in fats has been used as a measure of deterioration. Such ketones are volatile in steam, but analytical procedure based on this fact is complicated by the production of ketones during the steam distillation. However, if conditions are carefully standardised, ketone determination gives useful comparative figures. Progressive oxidation of fats causes a corresponding increase in the fatty acids insoluble in light petroleum. This, however, does not serve as a very useful indication of spoilage, because it is not until the early stages are past and the peroxide value has started to increase fairly rapidly that appreciable insoluble acids are formed. It is concluded that the peroxide value is still the most generally useful index of incipient oxidation.

Stansby,[21] however, has found the peroxide value unsatisfactory for the examination of fish oils. Apart from the reabsorption of iodine referred to already, a more fundamental objection is raised. The reactions involved in the oxidation of oils may be represented as follows:

Fresh oil⟶peroxide⟶rancid oil.

If the second reaction is more rapid than the first, the peroxide value will give no indication of deterioration. This appears to occur in fish oils. Salt fish, for instance, can go from fresh to rancid with only a slight rise in peroxide value.

Clark and Rugg[22] utilise a purely physical method for detecting oxidation of vegetable oils. They find that the film pressure at which a drip of oil just failed to spread on water increased consistently with the oxidation of the fat. Beier[23] has adapted a simple apparatus to determine volatile oxidation products in oils and fats. A small glass dish containing a measured quantity of a sulphuric acid/chromic acid mixture is supported over the sample in a closed vessel. The whole is then kept at 60° C. for 2 hours, after which the excess chromic acid is determined iodometrically. Normal values for many edible fats are given.

Proof of adulteration or purity of commercial fats often presents considerable analytical difficulties. These are aggravated, in the case of lard, by wide variations in the composition of the unadulterated fat, due to rendering the fat from any part of the carcase, and to the effects of different feeds. The latter cause, in particular, has given rise to very wide limits for the published figures for lard; Sutton, Barraclough, Mallinder and Hitchen,[24] however, from an examination of commercial lards are able to narrow these limits considerably. Of over one hundred samples the iodine value of 96 per cent. fell between 57 and 73, and the butyrometer reading of 95 per cent. of them between 50 and 52. The A.O.A.C. limit of 73 for the Bömer value* is found to be satisfactory for pure lard, a value of 70 corresponding with 5 to 15 per cent. adulteration with beef fat and a value of 65 with 15 to 60 per cent. adulteration. These conclusions were not accepted by all speakers during a discussion following the reading of the paper, some preferring the B.P. specification of a minimum melting point of 63 per cent. for the glycerides separating from ether under controlled conditions.

Modified analytical methods include a semi-micro apparatus for the determination of Reichert, Polenske and Kirchner values.[25] Dimensions about one-third of the standard apparatus enable 1 gm. or even 0·25 gm. of the fat to be used for the analysis, and the results are in good agreement with those obtained on the standard apparatus. Williams applies a photoelectric[26] method for measuring the melting point of fats, in order to eliminate a lack of agreement found between different workers. He also uses a dilatometric technique for investigating the melting of fats, and obtains definite and reproducible figures for incipient and true melting points. The expansion of fats during melting is characteristic and may be useful in identification.

High and low melting fatty acids are separated sharply if a petroleum ether solution is cooled to −50° C.[27] Practically complete separation, for instance, may be made in a mixture of stearic and oleic acids in one crystallisation. The sizes, iodine values, etc., of the two fractions are useful for detecting adulteration of fats. It seems, however, that the difficulties of operating at such low temperatures more than offset any advantages the method may have over, for instance, the Twitchell's lead salt/alcohol method.

Sugars and Sugar Products

No very novel methods have been recorded during the year. For the rapid determination of large numbers of reducing sugars Morell[28] has used a colorimetric modification of the ferricyanide method. The intensity of the colour, due to excess ferricyanide after reaction with the sugar, is measured photoelectrically. The fact that levulose exerts a much greater reducing action towards ferricyanide under mildly alkaline conditions at 50° C. is made use of in two methods for analysing sugar mixtures[29] A considerable correction has to be made for dextrose when this is present. If the dextrose exceeds the levulose by three or more times, the method is unsuitable. As maltose and lactose also interfere, this approach to the problem is inferior to the method proposed by Hinton and Macara (*Analyst*, 1931, **56**, 286), in which the levulose is determined by reaction with Luff's solution, after removing aldose sugars by oxidation with alkaline iodine.

Various modifications of standard methods have been proposed. Jackson and Macdonald[30] confirm the conclusions of previous workers that errors are introduced into Munson and Walker's tables, owing to absorbed organic matter being weighed as cuprous oxide. Cuprous oxide should preferably be determined chemically, and several standard methods are available for this purpose. One such method applicable to a semi-micro scale[31] is to dissolve the cuprous oxide in neutral ferric alum solution and to determine the reduced iron with permanganate.

Another "official" method found to be at fault is that sponsored by the Office Internationale for sucrose estimation in chocolate. Sucrose is absorbed during clarification by the standard method. Suitable modification of the technique overcomes this error.[32]

Biochemical methods of sugar analysis are the subject of two

* The Bömer value is obtained by adding to the melting point of glycerides separating from acetone under standard conditions a figure equal to twice the difference between the melting point of these glycerides and of their corresponding fatty acids.

(*Continued on page 9*)

FRUIT PRODUCTS

PROGRESS IN 1941

VERNON L. S. CHARLEY, B.Sc.

The Author in his laboratory.

THE year 1941 will not soon be forgotten by those whose duties lead them to deal with the processing of fruit. It was confidently hoped that Nature would at least "play the game" with some portion of the fruit crop and give a much needed fillip to the production of a number of products for which a good supply of raw fruit was a necessity; but, instead, the year was characterised by very poor crops for most varieties of fruit.

Apples

The 1940 apple crop had been slightly below normal (although the 1939 harvest was probably the largest in living memory), and the year 1941 started with a handicap, for there can be little doubt that the ubiquitous apple can be effectively used in a wide variety of ways throughout the food industry and a good crop of apples can be legitimately used to eke out supplies of more precocious sorts. The 1940 crop of culinary apples was apparently up to average; following the decision of the Ministry of Food to avoid much cold storage of home-grown fruit, large quantities of cull Bramleys were sent to the West Country for cider-making and for conversion into apple treacle. The 1941 crop was extremely poor, alike for cider and market sort of apples. The Ministry of Food appreciated the position of the cider and jam industries by allowing all apples of a size below 2-in. diameter to be sold only to licensed factories in these two industries. The controlled price of £18 13s. 4d. per ton, on rail, was a heavy increase from the 1940 price of £6 7s. per ton.

Soft Fruit

The soft fruit season was disappointing. In the first place, everything was late in ripening owing to the exceptional spell of cold windy days in late spring and early summer. The strawberry crop was susceptible to frost damage, especially from the early producing areas, but raspberries were more satisfactory. The blackcurrant crop appeared at first sight to be only a third or even a quarter crop, but, in view of the importance assumed by this fruit, it is fortunate that the long fine spell in mid-summer was succeeded by plentiful falls of rain which came only just in time to fill out the berries. In Norfolk, and to some extent in the West Midlands and Somerset, the fruit showed very peculiar colour changes on ripening. The red pigments were accentuated, and at first it seemed as if the fruit would never turn to its characteristic colour. Indeed, this dark colour was only fully developed after the rainfall at the end of July. It is very probable that the rain came too late to ensure normal berries. Many fruits appeared to be shrivelling before the rain came, and, although they showed normal development later, the composition of the fruit indicated that in some drastic way the life growth of the berries had been interfered with. This was perhaps most obviously shown by the figures for vitamin C. In closely controlled plots at Long Ashton the fruit in 1941 showed a 50 per cent. decrease in vitamin C over the average for the past few years. Nor was Long Ashton fruit exceptional in this respect, for it is estimated that the entire crop of blackcurrants contained only a little over half the normal vitamin content. The usual crop of about 8,000 tons was reduced to about 4,500 tons, of which 2,000 tons was taken over by the Ministry of Food for conversion into *purée* and syrup for the children.

The Plum Crop

The plum crop was extremely poor, and there was a very considerable demand for the fruit. The revised regulations for jam standards placed an extra importance on all fruits which contained pectin of a type suitable for providing a good gel, and plums were naturally in great demand for this purpose. For some reason not known to the author, he received a spate of enquiries concerning the cold process preservation of plums from jam-makers and fruit pulpers. No information is available to indicate whether many plums were put down in SO_2 by the cold method, but it is worth while mentioning at this point that the statements that the cold process causes such a loss of pectin that normal gels cannot easily be formed can be refuted. A large number of semi-commercial tests have been carried out, and while the set is not quite equal to that of jam made from fresh fruit, there is no doubt whatever that the set is perfectly adequate for safe keeping. The latest experimental work on this point has recently been completed at Long Ashton for the Ministry of Food and will soon be published. The author takes considerable comfort, on this controversial subject, to be able to say that his conclusions have the support of Dr. T. M. Morris of the Low Temperature Research Station, Cambridge, who has personally examined and discussed the experimental material with him.

Wild Fruits

The blackberry crop was a veritable godsend. In the West of England it seemed to be never-ending, and helped to compensate those jam-makers who may have felt that they had a raw deal either from Nature or from the authorities in the loss of such a large proportion of the blackcurrant crop.

Two further wild crops were utilised in the autumn of 1941. The enormous crop of elderberries had seemed worthy of collection, and, indeed, large quantities were used in domestic circles. A well-known Reigate firm, however, seized the opportunity to extend its production of concentrates and several hundred tons of elderberries were processed.

Rose Hips

Perhaps the most interesting development of 1941 (apart from the blackcurrant story) is the utilisation of the rose hip crop. Back in 1938 the writer had discussed this question with Dr. Darré, Reich Minister of Agriculture, in Berlin, who at that time was planting up rose hip bushes all along the Autobahn—to provide beauty first, utility afterwards! Despite the Minister's boast that thousands of tons of hips were being specially grown for vitamin C production, no obvious signs of gaily decorated main roads were seen that autumn, nor could the most impertinent enquiries elicit any information regarding methods of processing. But it was already known that the Scandinavian countries and Russia were making use of the rose hips, and although precise information was lacking, the Ministry

of Health initiated an experimental processing scheme in 1941, during the course of which about 200 tons of hips were processed. The ascorbic acid in normal blackcurrants amounts approximately to 150-200 mgs./100 mls. Southern-grown hips vary between 200-600 of the same units, while Scottish hips contain up to 2,000 units, and Russian varieties contain the amazing amount of 4 per cent. ascorbic acid.

The crop was collected by voluntary organisations such as schools, W.V.S., Women's Institutes, Girl Guides and Scouts, etc., but a price of 2s. per ·14 lbs., was paid to the pickers. This was purposely put slightly lower than the price of blackberries, and every attempt was made to prevent clashing with the fruit picking—the hips being collected subsequent to the blackberries. The country was divided up into areas and five firms participated in the scheme. One firm at Bristol processing one ton per day, were able to extract a liquor containing 5 to 6 lb. of ascorbic acid from this quantity of fruit by one straightforward extraction by a method which was suggested by the Long Ashton Research Station and which was used, with various modifications, by all the other firms concerned.

There are some delightful research problems involved, and a great deal has yet to be learnt before the processing can be really efficient. For example, the *p*H of a water extract of hips is about 6·4 and SO_2 as a preservative is practically useless. Extremely efficient buffering systems are present, and organic acids are almost useless for lowering the *p*H in order to decrease the fixation of the SO_2. The extracts contain large quantities of nitrogenous material, which, unlike those of the carrot, cannot be precipitated by heat. Hips from Southern England are characterised by extremely high pectin contents. The extracts have the consistency of gum, but pectinal action at 100° F. for 2 to 3 hours completely breaks down the viscous constituents. While hips can be made into jellies which have a fair jelly strength, it has been found by Dr. Magnus Pyke and Dr. Melville that the pectin is so weak that the jelly becomes practically liquid after a few weeks' storage.

A report on the research and commercial experiences at Long Ashton on rose hip processing will be published early in 1942.

Blackcurrant Production

The shortage of citrus fruit necessitated some steps being taken to provide children with the appropriate quantities of vitamin C. In view of the difficulties of supples of fruit, it was decided to confine the scheme to children under two years of age. A canned *purée* had been developed by the firm of Chivers and Sons, of Cambridge, and was being used for distribution to British prisoners of war. The product was chosen for the children of approximately six months to two years old. The blackcurrant syrup made at Messrs. H. W. Carters and Co.'s factory at Bristol by the Long Ashton method, was chosen for children under six months of age. Experience had shown that this syrup was well tolerated by very young children, even when citrus juices were not agreeable to their stomachs, and the decision to use the *purée* and syrup for children of the most important age group was a remarkable tribute to the two products concerned. From a nutritional point of view, it may be considered that the safety from scurvy of the entire child population under two years is now being practically entirely safeguarded by the blackcurrant products (although orange-juice concentrate will be used to follow on when the blackcurrant products are finished). Two-thirds of the amount set aside by the Ministry of Food for this scheme was processed into *purée* and the remainder into syrup.

Both schemes presented formidable difficulties from a technical point of view. It was necessary to can most of the fruit to enable the final processing into the sweetened *purée* or syrup to be extended throughout the winter and spring. This initial preservation was undertaken by about 12 canneries, which were equipped with suitable plant and which could satisfy the Ministry regarding technical matters and—most important—a complete absence of copper in their plant!

The low vitamin C content of the fruit necessitated the utmost care to retain the maximum amount of this vitamin, and analyses of all individual batches of canned pulp had to be carried out. Literally hundreds of extractions of the pulp (using the full method of extraction with metaphosphoric acid) have had to be carried out, and much information has been obtained regarding the extremely wide variations both in the fruit and the processed pulp. The syrup processing was commenced on 100 tons of fresh fruit from Somerset and the West Midlands and followed by the use of canned pulp. Only by the application of the fund of experience gained in previous four years' processing at the Bristol factory was the Government project carried through in July and August in a satisfactory manner. Conditions were extremely difficult, and the wide variation in fruit condition called for continual attention, both day and night, from the author, who was officially in charge of the syrup processing for the Ministry of Food, and the sense of relief when the last currant lost its identity in a sea of syrup must be experienced to be fully appreciated.

The production is still in full swing. The two products have been distributed to the children through clinics and local food offices since the middle of December, and the distribution will continue into the spring of 1942.

The project represents an enlightened effort to utilise to the limit the naturally occurring produce of this country for nutritional purposes. Many young children will now regard the blackcurrant products as being the natural source of their vitamin C. Adults, too, are becoming conscious of their indebtedness to this fruit and when the war is over there should be no question of returning to our previous utter dependence on foreign juices to supply our domestic needs. The blackcurrant products, in the view of the author, have come to stay, and, if this view be correct, then it would appear that their large-scale production in the official schemes must rank as the item of chief importance in the realm of fruit products during 1941.

Food Analysis

(*Continued from page* 7)

papers. One by Nicholson and Archibald,[33] the third of a series dealing with this subject, concerns the activity of *Proteus vulgaris* for removing dextrose, and its application to the estimation of this sugar. The other proposes a method for the determination of sucrose and raffinose in molasses, using high- and low-activity yeasts.[34] Low-activity yeast is first used, and attacks the sucrose, leaving raffinose unaffected. Subsequent treatment with high-activity yeast removes the raffinose. The latter sugar may be calculated from the changes in polarisation.

Tea, Coffee and Cocoa

Methods for the estimation of caffein and tannin have been described during the year. For the extraction of caffein from tea or coffee infusions, great saving of time is achieved if the infusions are clarified before extraction with chloroform.[39] No loss of caffein occurs and troublesome emulsions are avoided. Moreover, the caffein is obtained in a sufficiently pure condition to be weighed as such, nitrogen determination being unnecessary. Losses have been found to occur in the determination of caffein by the standard method of the A.O.A.C., due to incomplete precipitation with Wagner's solution under the prescribed conditions. Precipitation from a more acid solution overcomes this.[40]

Modifications of previous methods for determining tannin in tea and cocoa are claimed to increase their convenience. A volumetric method is proposed for tea.[41] The infusion is titrated with alkaline permanganate before and after removing the tannins with gelatin. The difference is a measure of the tannin present. The water-soluble tannins in cocoa are determined by precipitation with cinchonine, according to described procedure.[42]

Fermentation Products

The deep blue colour given by Folin-Denis reagent (sodium tungstate, phosphoric acid and phosphomolybdic acid) with tannins has been applied to the analysis of whisky and brandy.[43] Quantitative results obtained with a photocolorimeter, although low compared with those by permanganate titration, are probably nearer the truth, being less affected by non-tannin constituents. The correct colour filters and other conditions for the greatest accuracy are fully considered.

The preservative value of hops determined by Ford and Tait's method should be corrected for the preservative value of spent hops.[44] This is fairly constant at about 13·5, which figure may therefore be applied as a correction.

As a qualitative test for added caramel in vinegar, it is proposed to treat the sample with a tannic acid/formaldehyde reagent which gives a brown precipitate when caramel is present.[45]

References will be given in Part II.

(*To be continued*)

THE ICE CREAM INDUSTRY

PROGRESS IN 1941

ERIC HUMPHRISS, A.I.C., F.R.M.F.

THE past year is perhaps best described as one of substitution and scientific and technical adaptation, in so far as the manufacture of ice cream is concerned. With the prohibition of the use of milk and of milk products except, in the latter case, for stocks on hand, the industry was faced with the urgent problem of finding suitable substitute ingredients, and also of adapting mix compounding and processing technique to the use of such " new " mix components. The scanty supply of commodities other than milk products, added to the difficulties of certain sections of the trade, and the more recent restriction of egg products has increased these difficulties. Nevertheless, it can be stated that it has been found possible to market an " imitation " war-time ice cream which has met with the approval of the consuming public, and, moreover, one which is not without some merit from the nutritional point of view.

Restriction of Output

Supplies of essential ingredients such as sugar and fat have, of course, been allocated on a pre-war proportional usage basis. This circumstance has inevitably led to a restriction in output in the case of many manufacturers; the trade has accepted this state of affairs as an unavoidable consequence of the war, regarding it as " even as it should be ". Incidentally, there has been heard nothing but appreciation voiced for the sympathetic manner in which the Ministry of Food has dealt with the case of the industry as a whole. Further, as the author has good personal reason to know, the technical officers of the Ministry are interested in the possibility of utilising new nutritionally useful products in war-time ice cream, and readily facilitate experimental investigation thereof by ice cream manufacturers having the necessary laboratory and processing resources available.

Farinaceous Products as Ingredients

In view of the widespread use of farinaceous products such as cornflour in certain types of ice cream, coupled with the ready availability of ordinary flour, it was not surprising that the factors involved in its use in war-time ice cream should be first investigated. In point of fact, the matter was studied in several laboratories associated with ice cream manufacture simultaneously, and the obvious application of the well-known methods of starch degradation was investigated and worked out for the special case under consideration. The basic facts, once established, were made available to the trade as a whole through the medium of the Ice Cream Association and the columns of the trade journals. The nett result is that during the past year most of the ice cream available has been made basically from wheat flour, the starch content of which had been hydrolysed by the use of malt diastase to dextrins and maltose. Practically the whole of the normal milk-solids-not-fat content of the mix can thus be replaced by hydrolysed wheat flour. Optimum temperature conditions necessary to secure maximum liquefaction (viscosity reduction) as distinct from saccharification of the wheat starch have been determined, and in several plants the quantitative use of malt is based on its estimated Lintner value. Similarly, the conditions which tend to minimum aggregation of the gluten during mix compounding and processing have been established, so that the main practical difficulties associated with the use of flour in war-time ice cream manufacture can be regarded as disposed of.

Producing a Stable Emulsion

The second problem, essentially a colloid chemical one, which required examination was that of producing an emulsion sufficiently stable to withstand the rather severe " emulsion breaking " mechanical treatment to which mix is subjected during the freezing process.

A further important factor was that such mix had to be so designed as to permit of adequate aeration (overrun production) while being frozen. It is, of course, obvious that interfacial phenomena are primarily implicated, and this aspect of the matter has been studied both from the point of view of the continuous and also of the disperse phase of the mix emulsion.

The external phase (aqueous phase) of genuine dairy product ice cream is essentially a 10 per cent. solution of milk-solids-not-fat, sweetened, and containing a fraction of one per cent. of mix stabiliser—usually gelatin. The radically different nature of the 10 per cent. " wheat flour hydrolysate " will be apparent from a citation of a little quantitative data. The latter menstruum is, for example, approximately 65 per cent. deficient in protein, and contains 43 per cent. less mineral matter than does normal ice cream mix " serum ". Moreover, the protein and ash are chemically different, and more important still, are possessed of dissimilar physico-chemical properties. In addition, the new mix contains significant amounts of dextrins, and maybe, residual unhydrolysed starch.

The disperse phase in genuine ice cream is always butterfat. Milkfat or butterfat is, as is well known, unique in that it contains some 5 per cent. or so of water-soluble fatty acids and also has associated with it small but significant quantities of phospholipoids, both circumstances making for ease in emulsification or dispersion in aqueous media. In order, therefore, that such fats as refined vegetable oils, hydrogenated oils, etc., could be used in ice cream, the addition of emulsifying agents was found necessary. Lecithin can be used successfully, as also can many of the proprietary emulsifying agents available and advertised in the trade journals. Mineral additions are also invariably made to the new mix, and some revision of accepted ideas in regard to mix stabilisation has been found necessary.

Use of New Flavouring Materials

New products, such as soya flour, have been found useful, especially where either through the type of product made in pre-war times or lack of suitable equipment, full use of what may be termed the more recondite alterations in compounding and processing technique has not been possible.

Similarly, the use of " butter " and " cream " flavours has been found definitely advantageous in war-time ice cream, accompanied usually by increased quantities of vanilla flavouring. Saccharin, where it could be secured, has also been very successfully used to eke out the sugar allocation, though there are obvious limits beyond which it is not possible to go in this direction.

The increasing difficulty experienced in securing adequate supplies of high grade vanilla essence, coupled with the desirability of using rather more " vanilla flavour " in flour-base ice cream, has led to several of the larger manufacturers investigating the possibility of using vanillin, coumarin, etc., as flavouring agents. Similarly diacetyl has been used, and found effectively to mask to a considerable degree the " floury " taste which can be discerned in imitation ice cream. All these materials are, unfortunately, themselves becoming progressively more difficult to obtain.

Mechanical Difficulties

The purely mechanical side of ice cream production has not been devoid of difficulty. Carton manufacturers have perforce had to utilise paper and board of inferior quality, which, in spite of their best efforts, has resulted in packaging machine " embarrassments " in more than one plant where complex filling and capping machines are lined up with continuous freezers. These and kindred obstacles to the smooth working of production units have been gradually overcome.

(*Continued on page* 14)

THE CONFECTIONERY INDUSTRY

R. L. KENNY, B.Sc., F.I.C.

PROGRESS IN 1941

DURING the latter part of 1940 the effect of sugar rationing was making its pressure felt, and as the year drew to a close manufacturers had made marked headway against this very great problem by making the necessary adjustments in their production schedules. In the early part of 1941, however, a further difficulty cast its shadow over the trade. It arose as a direct result of the rationing of raw materials, and the various aspects of this new problem have occupied the attention of the whole industry. Manufacturers discovered that, although lack of ingredients placed confectionery in short supply, the position as far as the general retail trade was concerned was much aggravated by a Ministry of Food Priority Order which diverted large quantities of chocolate to the canteens and other allied organisations.

The position which existed at this stage may be summarised in the statement that although the sugar ration remained at 60 per cent. to the chocolate manufacturers and not less than 50 per cent. on the same basis to the producers of confectionery, many production units reserved a part of their total output for the benefit of priority orders because they were permitted to reclaim a portion of the raw materials used for this purpose, and thus attain a greater turnover. As the year advanced, however, the inequity of this measure was appreciated by the Ministry and a revision of priority introduced which has resulted in increased supplies being available through the normal trade channels.

The Influence of the Ministry of Food

The active collaboration between the Ministry of Food and the Confectionery Industry has been one of the outstanding features of the year under review. A firm foundation was laid by a Ministerial announcement last March referring to the formation of two war-time associations composed of the various groups engaged in the industry but which were formed with the object of carrying out the wishes of the Ministry. One association was inaugurated to deal with cocoa and chocolate products, whilst the other was to confine its attentions to sugar confectionery. These associations have made definite and constructive progress. They commenced by investigating the methods by which the manufacturers could be made to obtain the best results for all concerned from the limited supply of raw materials at their disposal. As a result of a recommendation put forward by these associations, the Ministry of Food introduced an order providing that as from the sixteenth of May no person should engage in the manufacture of chocolate and sugar confectionery unless licensed by the Ministry. Manufacturers whose total output did not exceed 25 tons in the year 1940 were excluded from the scope of the order until such time as their output reached that total in any one succeeding year.

The position was therefore clarified considerably in so far as it would only be necessary for the War-time Associations to legislate on behalf of approved manufacturers. The opening move of the associations introduced control in the form of a classification of all products into four price categories to operate amongst the manufacturers. Since this particular section of the Industry could claim the largest representation on these War-time Councils, such an initial step inspired confidence in the ability of the organisations to control the interests of the trade. The details of this scheme are probably sufficiently familiar as to render superfluous their inclusion in a survey of this nature. An increase in the quantity of the lower-priced goods produced was not effected by these changes, but their continued availability was ensured.

One of the main points in favour of this system of control lay in the fact that manufacturers who failed to carry out the requirements exposed themselves to the danger of being unable to secure further supplies of raw materials. Legitimate distributors were also protected by the fear that any of their community who ignored these new regulations might be severed from their source of supply.

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Elimination of the Retail "Black Market"

Up to this stage the work of the War-time Associations had produced very satisfactory results, but profiteering was still rife through the one avenue which had not yet been closed. A certain number of retailers were offering goods to the public at prices which showed them an exorbitant profit. Such tradesmen endeavoured to justify this action by putting forward the plea that, as rationing had reduced their turnover, it was therefore necessary for them to take an excessive profit on the fewer lines at their disposal in order to retain their sole means of livelihood. This attitude is, of course, directly contrary to the Government plan for the concentration of industry, and it aroused general agitation for the introduction of retail price control. Universal satisfaction was apparent when the Ministry of Food issued an Order, based on the recommendations of the War-time Associations, which controlled the prices of confectionery and chocolate to be sold to the public. This order provided for maximum prices ranging from 1s. 4d. to 4s. per lb. for sugar confectionery and from 1s. 8d. to 5s. per lb. for chocolate, according to which price group the individual product was allocated. In addition, the maximum consumer price of goods produced by manufacturers who were not members of either of the War-time Associations was fixed at 1s. 8d. per lb., and the only means which such manufacturers possessed of having their goods accepted in a higher priced category was by application for membership to their appropriate War-time Association, followed by the submission of the necessary particulars with regard to the costings of the line which they proposed to market.

From this brief summary of the work carried out during the course of the year it will be appreciated that the War-time Associations have made progress; a little too slowly at times, perhaps, for many of the more impatient, but it is felt that they have fulfilled their main purpose, and it is hoped that, largely through their efforts, the confectionery industry has been reinstated to the stage where unfair trading has been reduced to the bare minimum.

Production Research

There have been at least two very interesting endeavours on the part of the scientific branch of the industry to harness available raw materials to the production wheel. These materials had no use in the confectionery trade in times when the more usual raw materials were available, but great ingenuity has been exercised in making them sufficiently palatable as to be acceptable to the consumer.

The first innovation concerned an attempt to introduce carrots into confectionery. This vegetable is reputed to possess a sugar content in excess of the average, and another point in favour of its use is the fact that it is in plentiful supply at a cheap price. It is doubtful, however, whether the introduction of carrots gives sufficient edibility appeal to confectionery, and their use should be confined only to the very cheapest products.

Of much more interest is the experiment which has been made to incorporate whey concentrate into confectionery. An order was introduced by the Ministry of Food which prohibited the use of either fresh milk or cream in the manufacture of chocolate or confectionery products, as from April 1. It was, however, made clear at the same time that manufacturers who had acquired stocks of milk powder or condensed milk before that date would be allowed to use them up. Now, the particular section of the confectionery industry which probably experienced the maximum setback as a result of this order was that covering the field of caramel manufacture. The production of caramels is dependent almost entirely on the presence of milk solids, and it was in order to provide a suitable alternative for this ingredient that whey concentrate was introduced. Whey was available because it was a by-product of the cheese industry. Practically all the butter fat and protein has been removed, but by concentration of the residues it is possible to obtain products which possess a very high milk sugar content. The degree of concentration may be varied, but it may also be taken as far as the powder stage. In the experience of the author it has been found that, although the less concentrated liquids have very poor keeping qualities and consequently a life of only a few days in the factory as raw material, they nevertheless have a certain advantage over the concentrated powder in so far as the solids are much more easily soluble and a superior flavour is obtained in the finished product. Excellent caramels have been prepared by the utilisation of whey and their keeping qualities need not be suspect. Caramels containing whey as an ingredient have established a popularity in the United States over a period of many years, but as far as this country is concerned the author believes that the utilisation of this ingredient is a definite innovation introduced as a result of the difficulties which have confronted the manufacturer under the present circumstances.

Substitutes

During the year under review a flood of products has been placed on the market which were alleged to be adequate substitutes for certain raw materials no longer available. Many of these were discovered to be of a fraudulent nature and depended for their sales success on the introduction of bulking agents, such as flour or starch, which effectively disguised the true nature of the product. Sugar substitutes provide a typical example. The general nature of those examined was confined either to liquid sweeteners, consisting of solutions of saccharin, or to solid substitutes containing a mixture of flour, saccharin crystals and salt.

The problems of salesmanship were overcome to a large extent by manufacturers being able to take advantage of the fact that degree of sweetness is only a relative term and cannot be estimated by chemical means. It was, therefore, difficult to expose any ambitious claims, other than by means of tasting tests involving idiosyncrasy attached to individual palates. For milk and egg substitutes, products have been produced which rely on soya flour as the basic ingredient. The Government have decided to permit the importation of this raw material, since its high protein and oil content justifies its being regarded as a substitute for milk and egg solids. The main reason for condemnation of several of the products prepared was, however, the excessive profit obtained, amounting in some cases to ten times more than the cost of the ingredients.

Licensing Order Introduced

This section of the trade has suffered so much abuse that the Ministry of Food found it necessary to introduce an order preventing the sale of any substitute except under licence. As a result, several undesirable products have disappeared from the market at a speed equalled only by the astonishing rate at which they made their appearance. It is necessary to emphasise at the same time that the judicious use by bakers of soya flour, carefully blended in small quantities in certain recipes, will produce improved results when eggs and milk are not available as a regular supply.

As a result of the abuses to which substitutes have been subjected, the word is now apt to arouse suspicion in the minds of the majority of people. This is to be regretted since it has fallen to the lot of nearly every technical management to introduce substitutes of proved value, in order to be able to market particular lines. Scientific application has ensured that very little depreciation in quality should ensue, but in cases where the necessary standards could not be obtained, several manufacturers have not hesitated to withdraw well-known lines and substitute new lines of a poorer quality. This was entirely due to the shortage of raw materials. This tendency was noticeable in cases where manufacturers had originally spent large sums of money in advertising certain products, and they were naturally desirous of retaining the goodwill and reputation which the particular line had created. In these circumstances the most sensible course open to the manufacturer was to withdraw the brand for the period of the war and to introduce it again when circumstances permit the free use of quality raw materials.

The Great Fruit Shortage

The Industry has been sadly disappointed at the quantity of fruit available both in the form of jams and fruit juice concentrates. Manufacturers had resigned themselves to the disappearance from the market of practically all the essential oils on account of the source of origin, but they were looking forward to being able to utilise the English fruit crop to make good the deficiency of flavouring materials which was bound to be created. Unfortunately the size of the fruit crop for any particular year is largely dependent on climatic conditions, and these were not very favourable in 1941.

An added difficulty was introduced because several growers, at the request of the Government, utilised their acres for the production of essential vegetables instead of the cultivation of fruit. Both these circumstances led to a short supply of fruit, and a position was created where certain manufacturers had been granted a licence to prepare jam and were able to obtain a sugar allocation for this purpose, but their output was controlled by the quantity of fruit which they were able to purchase, and this in no way satisfied even their minimum requirements.

It will readily be appreciated as a result of these observations that the predicament of the essence distiller would be even worse, since sympathetic priority consideration on the part of the grower was bound to be exercised in favour of the jam manufacturer. Consequently the range of essences available has been very limited and the rationing of alcohol has further accentuated the difficulties in this direction. The industry has had to rely to a greater extent on the use of the synthetic flavours, in which category Vanillin, Coumarin and Citral may be placed as examples. The disparity in the results obtained by the use of these synthetics is probably best illustrated by the following explanatory note on the relationship between Citral and Lemon Oil. Citral is the aldehyde naturally occurring in Lemon Oil to which the odour and strength of the oil is largely attributed. But in the true oil esters and other aldehydes are also present which modify and provide a mellow background to such an extent as to render the finest Citral obtainable only a poor substitute for lemon flavour.

An endeavour has been made in the foregoing notes to draw a general picture of the difficulties encountered in the industry and the moves made to overcome them. The co-operation achieved in all sections of the trade has been outstanding, particularly in regard to the pooling of resources.

FOOD MANUFACTURE 1941 INDEX

THE 1941 index of FOOD MANUFACTURE will shortly be ready, and copies will be available to subscribers on receipt of a stamped addressed envelope.

It is recommended that the envelope be 10 inches by 8 inches to avoid undue folding of the index.

ROAD TRANSPORT OF FOOD

PROGRESS IN 1941

H. SCOTT HALL, M.I.A.E., M.I.T.A.

IN reviewing a year's progress in the important function of road transport—namely, the conveyance of foodstuffs—it is usual to concentrate rather on developments which have taken place in vehicles, making them, for one reason or another, more suitable for the end in view. This year, for obvious reasons, that aspect of the subject must take second place: of greater importance is the development of methods which tend to provide for more effective distribution at the expense of less and less fuel and involving the use of fewer and fewer vehicles.

Much has been done in a variety of ways to ensure adequate distribution under what might be called normal war conditions—so far as this war is concerned—and in provision for what has been found necessary and may again be needed in cases of emergency.

War and Road Transport

One thing this war has demonstrated beyond a shadow of doubt is that road transport is now absolutely essential for the distribution of foodstuffs. Several attempts have been made by Regional Transport Commissioners to diminish its employment and to divert traffic to the railways. The object in all cases has been the laudable one of saving valuable petrol and fuel oil. Dissatisfaction has, in nearly every case, been the outcome of these efforts.

It was laid down, for example, during last winter, that sugar beet, as to the greater proportion of it, was to be carried from the farms to the factories by rail—apart, of course, from the initial conveyance from the farm to the nearest station. That scheme broke down. Nearly 80 per cent of the crop had to go by road, the fact being that without road transport the bulk of the crop would be lost.

Petrol was refused for the conveyance of potatoes from the Eastern Counties. The ban was lifted, perforce, just in time to prevent utter loss of the season's crop of new potatoes, for the reason that when it came to the point the railways were unable to deal with the traffic. A similar last-minute concession had to be made in respect of fuel for conveyance of soft fruits from the same area.

The Road Transport Commissioner for the Eastern Area suddenly forbade hauliers, who for years had customarily conveyed potatoes from Cambridgeshire to Banbury and district, to proceed beyond Buckingham. The result was a complete absence of potatoes in Banbury and district for some days. An attempt was made to alleviate this famine by the use of the railways and was found to be almost entirely impossible. The potatoes which were despatched by rail were discovered, after a couple of days' further absence of the vegetable from Banbury, to be in a siding at a small village station four miles from the town.

Transport of Fresh Vegetables

Similar difficulties arose in connection with the traffic in fresh vegetables to the Leeds market. The use of road transport was severely curtailed, and as a result deliveries (by rail) were taking two and three days where one day was previously the rule. When delivered the goods were out of condition owing to the delay and severe loss was sustained both by deterioration and wastage.

Road transport has played a prominent part in meeting emergencies arising from air raids. Numerous instances could be cited of this: one will be sufficient. It relates to an emergency of this kind which arose in Liverpool in May last. There was an acute shortage of bread. A bulk order was telephoned to Manchester and district which, in the next few days, responded with 500,000 loaves, all road borne. Manchester vans, loaded to capacity, worked direct from their bases to the Liverpool bakers' distribution depôts, whither the bread was sent out by local vans to the shops. The whole proceeding was described in Liverpool as a triumph in emergency transport.

Transport Pools

An outstanding aspect of traffic and particularly of developments due to war conditions, has been the working of various pools. One, of country-wide establishment, has been that for the distribution of livestock and meat, the first from farm to market and from market to abattoir: the second of the meat from abattoir to wholesale distribution centres and to the retail shops. The organisation responsible for this work employed haulage contractors, paying them at rates calculated on the basis of pre-war profits, and it is claimed that the saving to the country, in respect of expenditure on this most essential traffic, was in the neighbourhood of £1,000,000 per annum. Furthermore, the distribution was effected more expeditiously and efficiently than could possibly have been achieved by any other means, having in mind in particular the scheme of rationing which is in force for that commodity.

Government Haulage Scheme

The latest development of this kind is in process of establishment at the time of writing. It is the Government Haulage Scheme under which the Minister of Transport becomes, in effect, a forwarding agent. He is building up a central fleet, hired from road transport contractors, of 2,500 vehicles, supplementing that by a scheme for hiring of further vehicles as and when required for casual haulage, whilst behind the whole scheme lies one for the summoning of 50,000 to 100,000 vehicles in the event of emergency. This scheme, although it does not embody the principles underlying those of the meat pool, is nevertheless, to a large extent, the outcome of that pool.

Pooling System Extended

The author referred, in an article a year ago, to the development of the system of pooling transport adopted by the manufacturers of cocoa and confectionery. The pre-war distribution, common to several of the leading firms in that industry, whereby goods were sent in bulk to railhead depôts and distributed thence by vans, has been co-ordinated so that the larger firm was able to make use of the depôts and vans belonging to all of the others, and, furthermore, these facilities were thrown open to the smaller concerns who hitherto had not developed their transport along such ambitious lines. As the result of this co-operation, millions of miles of running of vans have been saved and hundreds of thousands of gallons of petrol.

Since then a similar plan has been developed by the Cocoa and Biscuit Wholesale Manufacturers Defence Committee, under the chairmanship of Mr. J. R. Gales, a director of Huntley and Palmers. A like success has been achieved and considerable economies effected.

Long-Distance Fruit Traffic

A scheme of a different kind, but having the same object in view, had its origin in Kent. A pool was formed to deal with long-distance fruit traffic. Vehicles of the carrying capacity of 8 tons or over were enrolled from amongst those hauliers in the district who were accustomed to this class of traffic. Means were then taken to obtain the co-operation of concerns in Bristol, Liverpool, Manchester, Leeds, Newcastle and Glasgow, who had loads to offer in a contrary direction, so that no dead mileage need be run. The immediate intention of the organisers was to provide justification for the issue of petrol for these long-distance services, and it was only possible to do so if, as this co-operation provided, the Regional Transport Commissioners could be assured that there was to be no wastage.

The same organisation developed a scheme for ensuring quick turn round of vehicles running into Covent Garden with fruit and vegetables from Kent. They appointed a full-time representative in the market, whose duties are to book drivers and

vehicles into the market when they arrive, see that the minimum of time is lost in unloading and in obtaining an outward load and to get to the root of the causes of the difficulties and delays which hitherto had so frequently arisen. This official also has the responsibility of arranging that empties are promptly available, to be dealt with as soon as the vehicles are unloaded. He time-checks the vehicles out of the market and thus obviates unnecessary delays.

Seaport Traffic Pools

Then there is the development of the traffic pools which have been established at the principal ports, with the object of distributing, quickly, efficiently and economically, enormous quantities of foodstuffs arriving by boat and needing rapid handling. These pools are now in effective operation at all the principal ports, and the amount of work which they do is indicated by the fact that sometimes as many as 200 lorries of the biggest load capacity (say a total tonnage of 2,500 tons) are required in a day.

In some seaports, as in Liverpool, for example, there are local cartage pools for specialised traffics such as bacon and hams (ex ship to cold store), butter, cheese and eggs (ex ship to cold store and warehouse), canned meats (ex ship to warehouse), heavy meat (ex ship and cold store to wholesale markets), and retail meat distribution (markets and abattoirs to meat retailers). In all this work regular carriers, fully versed in the technical conditions of the work in which they are customarily engaged, are employed for the work so that everything goes smoothly and with precision.

Vehicles

So far as vehicles are concerned one effect of the war conditions has been to emphasise the longevity of some of the best makes of chassis. The normal practice of most users of commercial motor vehicles is to replace them at periods varying from two to six years, according to the work upon which they are engaged and the type of chassis. This policy is, in peace time, a sound one. It ensures that maintenance costs are kept reasonably low and that the operator enjoys the advantages accruing from the use of up-to-date machines which embody, in their design and construction, all those improvements which manufacturers put into their products from time to time. Now, one at least of those incentives to change is almost lacking, since makers of vehicles are unable to direct their energies to the production of new models. Moreover, there are very few new vehicles to be had, so users must, willy nilly, make do with what they have and make them last.

As an example of what can be done in this way, the experience of Bell and Son, Ltd., the well-known millers of Newcastle, may be quoted. This company reports the continued satisfactory operation of an A.E.C., which already has 300,000 miles to its credit. There are many other similar cases which could be cited.

New Vehicles for Old

About six months ago the Government, realising at long last how essential road transport was to the prosecution of the war effort, and appreciating that this policy of making vehicles last could quite easily be overdone, arranged for a limited quantity of new machines to be placed on the market. Manufacturers have risen to the occasion and the following brief notes of what is being done in this way will no doubt be of assistance to manufacturers and wholesalers in the food production business who wish to replace some other old vehicles by new. It will be appreciated, of course, that before a new vehicle can be purchased permission must be had from the Ministry of War Transport.

Commer Cars, Ltd., offer the comprehensive range of their Superpoise chassis. It comprises 15-cwt., 25-cwt., 1½-ton, 2-ton, 3-ton, 4/5-ton and 6-ton models. The first and second of these are now available with full forward control as well as in normal control form. The 15-cwt. and 25-cwt. chassis have four-cylindered engines and the forward control machines, with a 10-ft. wheel-base in both cases, have 9 ft. of body space measured to the back of the frame. The normal control models are made in two wheel-base lengths—9 ft. 2 in. and 10 ft. 2 in.—the longer have an 8 ft. 6 in. body space and the shorter being capable of accommodating a 7 ft. 6 in. body. All the rest of the Commer chassis have six-cylindered engines. The 1½- and 2-tonners are standardised as large-capacity vans, and are offered only with normal control. The 3-tonner is available with a 10 ft. or a 12 ft. 9 in. wheel-base, the respective maximum body space being 10 ft. 4⅜ in. and 14 ft. 5⅛ in. The 4/5-ton chassis is built with wheel-base dimensions of 10 ft. or 13 ft. 9 in. The 6-tonner has the same dimensions and body space as the 4/5-tonner. The latter is 10 ft. 4⅜ in. and 15 ft. 11⅞ in.

The Ford Motor Company offer two models, a 4/6 tonner in two wheel-base lengths and a 10 cwt. van. There is prospect also of the commencement of delivery in a short while of a 2/3-ton model and a 25/35-cwt. machine.

Karrier Motors, Ltd., offer the well-known Bantam, which can be supplied as a 2-ton lorry with or without tipping gear, as a van or as a tractive unit of an articulated unit, in which case the recommended payload is 5 tons.

Morris Motors are concentrating on a drop-sided lorry of 3½-ton capacity.

John I. Thornycroft and Co., Ltd., offer their Nippy, Sturdy and Trusty chassis. The first named carries a maximum gross load of 6 tons and is a forward control vehicle with 10 ft. 1½ in. wheel-base and a body length of 12 ft. 3 ins. The Sturdy carries a payload of 6 tons. It has a wheel-base of 13 ft. 4 in. and a body space of 17 ft. The largest vehicle, the Trusty, is a maximum load four-wheeler for 7/8-ton payloads, has a wheel-base of 15 ft. 3 in., and can accommodate a body 18 ft. 8 in. long.

Tilling Stevens, Ltd., of Maidstone have introduced a new Vulcan, a 6-tonner with full forward control, wheel-bases 9ft. 9 in. and 13s.

The International war-time model, rated as a 5/6 tonner, can undoubtedly quite easily carry a payload of 7 tons. It is offered with a wheel-base of 13 ft. 5 in. for use with tipping bodies, 14 ft. 11 in. for normal body work, and has a tractive unit of an articulated chassis, wheel-base 11 ft. 5 in.

The Austin Company have introduced two models of a 4/5-ton chassis. One of them is a long wheel-base model, the dimension being 13 ft. 1¾ in., giving a body space of 14 ft. The other is a short wheel-base machine—9 ft. 3¾ in., with a body space of 8 ft. 3 in.

Vauxhall Motors are also releasing two models of a 5-tonner: one with a wheel-base of 13 ft. 1 in., the other wheel-base 9 ft. 3 in.

Guy Motors are offering the Vix-Ant in three forms. All are semi-forward control, and one has a wheel-base of 12 ft. 6 in. It is the standard lorry chassis, and will carry a load of 4 tons with a body 14 ft. long. The other is for use as a tipper or as the tractive unit of an articulated vehicle. It has a wheel-base of 8 ft. 5 in.

The Ice Cream Industry

(*Continued from page* 10)

Transport has, of course, been a major problem. The voluntary "zoning" scheme recently put into operation by several of the larger manufacturers, with the approval of the Ministry of Food, will undoubtedly effect a considerable economy in this respect.

The fact that, under the recently introduced control of vitamin concentrates, it is apparently not intended to allow the continuance of the fortification of ice cream with vitamins A and D where this had been the practice, is, in the author's opinion, unfortunate. There are, however, indications that the nutritional value of ice cream, even the war-time variety, is not entirely unrecognised in official quarters. Perhaps it is the industry's own fault that this aspect of the matter has not been as much to the fore as possibly the circumstances necessitated.

In concluding this short survey of the past year's efforts and achievements it may not be irrelevant to indicate what, taking the long view, appears to be the most satisfactory feature of the industry's efforts to date: It does seem to the author that some of the research and the results that have emerged therefrom, while of undoubted value to the trade at the present time, will also prove useful in post-war years when return is made to a milk product ice cream. Indeed, it may ultimately be found that some contribution will have been made to the subject of colloid chemistry as a whole—especially in the realm of emulsions.

ICE CREAM STANDARDS

An abstract of a lecture delivered by L. J. HYNES under the auspices of the Midlands Division Ice Cream Association. The author urges that the ice cream industry should be prepared for post-war legislation.

THE question of ice cream standards assumed great prominence shortly after the passing of the Food and Drugs Act, 1938, although it had been discussed in the trade for some ten years before that time.

There was much difference of opinion, which was intensified when the standard as officially proposed by the Ice Cream Association became known. At an extraordinary general meeting called by the Association, yet another complication was introduced by an attempt (which proved unsuccessful) to get included in the Association's definition of "ice cream" a clause limiting the amount of stabiliser which the product might contain.

The arguments went on, until somebody remembered that the matter of bacteriological standards had been forgotten altogether, and there followed further argument about that. At about the same time the Association authorities took a ballot among their members on the standard as it stood officially proposed, with the stabiliser clause deleted but with the minimum milkfat content, where it had always been, at 8 per cent. of the product by weight, and although the result of the ballot showed a majority of slightly over 2 to 1 in favour of the standard, it appeared that many members had not voted, with the consequence that, apart altogether from any question as to what non-members of the Association might think about the matter, there was still a doubt as to the general feeling in the Association itself. In the end—the war put an abrupt stop to the struggle—the only thing which stood out clearly was that the industry was divided into about a dozen dissenting elements.

It is necessary for the trade as a whole, and especially that numerically important section of it which consists of small manufacturers, to reach general agreement on the main essential points of standardisation. All this relates to normal ice cream and not the war-time article, and these recommendations refer not to abnormal war-time conditions, but to those existing before the war which will exist, it is expected, afterwards.

There can be no doubt but that the establishment of standards is practically inevitable, and the task for the industry is to decide on broad lines what standards would be, from the industry's point of view, the least objectionable. The Minister of Health is already empowered by Act of Parliament (the Food and Drugs Act, 1938) to make standards for ice cream, and that he will do so after the war is, in many people's opinion, certain.

Bacteriological Standards

With reference to bacteriological standards, there is the necessity to guard against both pathogenic and non-pathogenic organisms, and the total bacterial count should be kept as low as possible. Although a high bacterial count may not be indicative of pathogenic organisms, it does prove that all is not right with the ice cream plant or that there is something undesirable elsewhere. The fault may be in the raw materials or in the lack of cleanliness in the factory (using the word in its widest sense) or that someone is working in it who for one reason or another connected with hygiene has no right to be there. Furthermore, it often, although not always, happens that when the bacterial count is high, coliform organisms—bacteria of the *Escherichia-aerobacter* group—are present in significant numbers, which is an indication of insanitary conditions.

B. coli

These coli organisms do not themselves cause any definite disease; neither does their presence in ice cream indicate definite contamination by disease-producing bacteria. They are, however, associated with fæcal matter or sewage, both animal and human, and obviously their presence in appreciable numbers in ice cream must be taken seriously by the manufacturer.

Raw milk always contains *B. coli*, the source of contamination being the fæcal matter of the cow, so that the fact has no particular significance. But the organism is destroyed by efficient pasteurisation. Consequently, if it is found in ice cream one of two things is certain; either the mix was not pasteurised properly (or, of course, boiled), or that contamination occurred subsequently. In either case there would be need for a careful check.

L. J. Hynes, who is Technical Adviser to Facchino's Purity Biscuits, Ltd.

Those traders who use cold mix powders requiring milk should always use it pasteurised or sterilised. The water used in these mixes should be of irreproachable purity.

Bacterial Counts

Taking everything into consideration, the author favours for the purposes of a workable bacteriological standard a maximum count of 150,000 organisms per cubic centimetre, as determined by the usual plate method, with *B. coli* absent in 1 c.c.

Comparing this standard with those of other countries, it would be more stringent than in five out of the twelve states of the U.S.A., where these standards are in operation, less stringent than in five others and on the same level as the remaining two. Two states, Georgia and West Virginia, permit bacterial counts of no fewer than 500,000, with no stipulation as to *B. coli* content. In Queensland, Australia, the bacterial count must not exceed 50,000 organisms per c.c., and neither *B. coli* nor any pathogenic organisms must be present. In Tasmania the bacterial count is 500,000, and no mention is made of *B. coli*. New Zealand is more particular, allowing only 50,000 bacteria per c.c. The bacteriological standard before the war in Holland was 100,000 organisms per c.c. with *B. coli* absent. The Municipality of Ghent, Belgium, had an amazingly severe standard which allowed a maximum of 5,000 bacteria per c.c., with all liquefying colonies, intestinal and pathogenic organisms absent.

It will be seen that there are startling differences of opinion on the matter of bacteriological standards. The standard suggested for this country lies between two rather wild extremes. The whole matter will have to be discussed when it is clear that steps are being taken to set up ice cream standards. One thing, in the author's opinion, is very necessary—that the Government should specify exact details of the procedure to be followed in the making of bacteriological examinations, in order to secure uniformity throughout the country. It would be intolerable to have the law operating more severely in one district than in another owing to the adoption by different bacteriologists of more or less different methods.

Chemical Standards

The question of a chemical standard for ice cream is far more difficult, or, at any rate, far more involved, than that of a bacteriological one. In this connection two things must be borne very carefully in mind: first, the object of the Government in proposing to set up a chemical standard; second, the fact that this standard is to apply to an industry of which the constitution, far from being simple, is very complex, comprising as it does manufacturers carrying on business on a hundred different

scales, producing by vastly different methods and marketing their goods on more or less different lines. To formulate a standard which shall be just to the whole trade and practical for every section of it, while still being adequate for the purpose behind it, is not an easy matter.

The object of the Government in proposing to establish a chemical standard for ice cream, a food commodity for which there is obviously a demand big enough to justify such legislation, is presumably to ensure that all ice cream shall be a good and genuine commercial article and as nutritious as a commodity which is primarily a delicacy may reasonably be expected to be. Its wholesomeness and purity from a bacteriological standpoint will, of course, be safeguarded by regulations with which a chemical standard is not, as such, concerned.

Why is a Standard Necessary?

Why is a standard apparently considered necessary? Briefly, because the Government is satisfied that a significant proportion, at least, of the ice cream hitherto sold has not been good enough.

Whatever standard may eventually be established, it will require the composition of ice cream to be such as to make it essentially a milk product. To do otherwise would be to throw the door open wide enough to admit so many things that the only true definition of ice cream would be that it was a frozen hotch-potch. The history of ice cream shows beyond all doubt that it began as essentially a milk product and continued as such until a few years ago when a tendency developed to replace one of the two groups of milk solids, the milkfat or butterfat, by vegetable fat or similar substitute, as being cheaper. The author was not going to argue as to the merit or demerits of a product of this sort.

Ice Cream—A Pure Dairy Product?

If it is eventually decided that ice cream must be basically a *pure* dairy product it can include no fat other than milkfat. If, on the other hand, the view is taken that the addition of a small amount of a milkfat substitute—not enough to destroy the essential character of ice cream as a milk product—would enhance the food value of the article and tend somewhat to improve its quality, then a stipulated maximum of substitute fat might be permitted. The question is obviously one of some considerable importance, and, as far as the trade is concerned, there is no doubt that at a suitable time both the trade organisations will give their members an opportunity of discussing it fully in order to ascertain the general feeling on the matter.

Assuming that ice cream will be required by law to be essentially a milk product, if not an absolutely pure (that is, unadulterated) milk product, it necessarily follows that the "reconstituted" type of ice cream, as made from butter, skimmilk powder and water, or from water and any other suitable combination of concentrated milk products, will be just as entitled to be described simply as "ice cream" without any qualifying prefix, as the fresh milk-and-cream article. The one is just as truly a milk product as the other. The author finds himself unable, therefore, to agree with those who would require the reconstituted type of product to be described as "reconstituted ice cream", with the implication of essential inferiority which such a description would carry.

Before such a requirement could be justified a legal definition would have to do more than insist that "ice cream" must be essentially a milk product. It would have to insist that it be essentially a *fresh-milk* product, if not a fresh-milk-and-cream product, and to go as far as that would be to go too far, farther than any standard in the world goes.

Minimum Milkfat Content

What minimum content of milkfat ought a legal standard to require? This question of milkfat content is important (though by no means all-important), not only from the standpoint of food value and palatability, but also because milkfat is the most costly constituent of ice cream; for, of course, it is essential that a standard, besides being adequate for its purpose, must be practical commercially.

The assertion that milkfat is by no means all-important from the standpoint of food value and palatability should be stressed. Ice cream needs a certain amount of milkfat, of course, if it is to be sufficiently palatable and sufficiently nutritious, but as far as nutritive value is concerned far too much emphasis has been placed in the past on the milkfat content. The "standard" question has been spoken of almost entirely in terms of it, as though nothing else mattered. That attitude was wrong.

Professor G. D. Turnbow, the famous American authority on dairy products, and especially ice cream, says on this point: "The results of scientific research, the investigation of the dietetic values of foods, the ever-increasing knowledge of vitamins and the recognition of the real values of mineral salts during the past few decades have proved that rigid adherence to the 'butterfat' standard is a mistake, and the general opinion that the food value of ice cream is determined by its butterfat content a fallacy."

While, therefore, we must not minimise the importance of milkfat content in discussing an ice cream standard, we must be careful not to exaggerate it. We must keep milkfat in its proper place.

In considering this matter it is proposed, for the sake of clarity, to divide ice cream manufacturers into two broad classes: those carrying on business on a small scale, in which certain equipment is used, and those carrying on business on a larger scale, in which different and more elaborate equipment is used.

The Small Trader

Taking first the case of the former; ice cream, as manufactured by the smaller traders, can be made a nutritious and palatable article, one representing good value for money, on a basis of some 4 per cent. of milkfat—possibly a little less, especially (from the standpoint of palatability at least) in the case of the custard type of product. But if we say 4 per cent. there can be no doubt at all, and the foregoing statement would be true both of the custard and the "dairy" type of ice cream. The content of serum solids, with the invaluable proteins and minerals, could be carried to about 12 per cent—slightly higher, if desired, in the case of the "dairy" type ice cream, since it would contain no starch—and with cane sugar ranging from 12 to 13 or 14 per cent., we should have a nutritious and a particularly well-balanced article of food. The mix would be frozen, as always in the case of small-scale manufacture, to show only a very moderate or even a decidedly low overrun, so that the frozen product, containing plenty of food solids and not much air in any given volume, would be excellent value at the prices ordinarily charged. As a matter of fact the famous "ice milk" of California is made on these general lines, and it has been recognised as a most healthful and excellent foodstuff by a number of American authorities, most notable among whom was Professor G. D. Turnbow of California University Dairy Department, to whom reference has already been made. In this connection Professor R. B. Stoltz, in an address delivered at one of the American conventions, advised his hearers as follows: "If you desire to sell ice cream as a dessert and a delicacy, make it rich in butterfat and low in milk-solids-not-fat. If you desire to sell ice cream as a food, something on which you can make a meal, a dish which will satisfy all of the body requirements, then make an ice cream that is more similar to the solids found in milk." That last sentence should be noted, and also, incidentally, that Professor Stoltz does not discriminate between the high-fat and the low-fat articles when using the term "ice cream", thereby implying that it is equally as proper to use it of the one as of the other. Those who have contended that the term "ice cream" implies the use of cream in the product may be interested in this. Such a contention, so obviously open to question, is a poor argument for a high milkfat standard. The word "cream" is often used in combination with some other word to describe a cream-like or creamy substance, which far more often than not contains no cream, and it might well be argued that that is the sense in which it is used and always has been used in the term "ice cream".

Five per cent. Milkfat Standard

Suppose, then, that the Government proposed to set up an ice cream standard based on a milkfat content of 4 per cent. of the product by weight; or, conceding a point in the interests of palatability, say, 5 per cent. There would doubtless be other requirements, but they would present no difficulty. Would such a standard serve the Government's purpose in guaranteeing the public a sound and healthful ice cream? It has been attempted in the foregoing to show that it would; and, as far as the 5 per cent. of milkfat is concerned, that is precisely the proportion, in

conjunction with the 12 per cent. of serum solids that has been suggested here, which Professor Stoltz goes on to instance as giving an ice cream fulfilling all the requirements of a well-balanced food. Would such a standard be practicable for the generality of small manufacturers? There does not seem to be the slightest doubt that it would. A 3 per cent. milkfat ice cream, such as many if not most of them made, could be raised to 5 per cent. at very small extra cost, calling for no increase in the selling price and scarcely any adjustment, if any at all, in the size of the portions served.

Practicability of the Standard

Clearly, a standard which would be practical for the great majority of the smaller traders, including most of the smallest, would be practicable also for the larger manufacturers, many of whom, as a matter of fact, used to exceed it in normal times, often by a considerable margin. Others used a substitute fat in conjunction with milkfat, while others again used a substitute entirely, the object in all cases being to build up the total solids so that the mix would stand expansion to a high volume. That is the American theory which all our considerable manufacturers adopt, and which, for those who are in a position to adopt it—those who have the necessary equipment—is very sound. But whether or not a manufacturer used in the past a substitute fat to build up his solids, and whether or not the regulations under a standard would allow him to do so, to a limited extent; again, a 5 per cent. milkfat standard would be practicable for him, as being far from excessive.

This standard, besides being adequate for the Government's purpose and at the same time practicable for the trade in general, would have several other advantages. It would be low enough to induce all but an insignificant number of manufacturers to comply with it; it would, therefore, sweep away most of the poor stuff, it would raise the average quality level of much of the rest, and, of course, would leave those who wished to make a richer article quite free to do so. Obviously, the number of the latter would not be less than it was under no standard at all, so that a 5 per cent. standard, while raising the quality of much of the ice cream sold, as has been said, would tend to lower that of none. It would do this without affecting prices. It would impose hardship on nobody, give unfair advantage to nobody, and leave open to all a fair field for honest competition.

It is suggested, then, that the chemical standard which seems certain to come in due course, be formulated round a minimum milkfat content of 5 per cent. by weight. That being settled, the remainder of the official definition would give no serious trouble.

If, for example, it required ice cream to contain not less than, say, 15 or 16 per cent. of total milk solids (including the 5 per cent. of milkfat), nobody would object. Every ice cream maker could easily meet that requirement, and many manufacturers, including all of any considerable size, would go beyond it, as much from practical necessity as from choice.

Frozen Desserts

Frozen desserts may be divided into two simple classes: " ice cream " for products complying with the standard, and " ices " for products not complying with it, whether the latter were mere water ices or whether they contained some milk solids. There would then be no inducement for a man to put a small but appreciable amount of milk solids in an " ice ", since by putting in a little more, at very small extra cost, he could make it legitimate " ice cream ". If he wished to make a simple water ice (for which there might be, and probably would be, a certain demand), then he would be free to do so, and he would sell it as an " ice ". Similarly, the man who wanted to make a sort of sherbet after the American style—a water ice with a small quantity of milk or skim-milk solids—would also sell it as an " ice ", and those who preferred the one sort of " ice " to the other would buy it. But all " ices ", whether of the sherbet type or not, would be quite distinct from " ice cream " —as, in fact, they should be. And if events proved that the demand for the sherbet type of " ice " cut out the simple water ice, that would hardly be a tragedy!

Milkfat Standards Vary with Conditions

In the states of the U.S.A. the average milkfat standard is, of course, much higher than the one suggested—which, incidentally, is much the same as that established a few years ago in Northern Ireland, though the latter has one or two features which, rightly or wrongly, the author has always considered a little unwise. The average American milkfat standard seems to be 10·7 per cent. A few other countries have had more or less similar standards. But does it follow that what may be good and suitable for America, or for any other country, would be similarly good and suitable for England? Conditions may be different. They would appear to differ, in fact, even among the American states themselves, inasmuch as we find in some states an 8 per cent. milkfat standard and in others one of 14 per cent. The authorities in Texas, for instance, apparently could not argue that what was excellent for Maine or Nebraska must also be excellent for Texas, and it is evident that they did not argue like that, since Texas has an 8 per cent. and Maine and Nebraska have a 14 per cent. standard. Still less, therefore, could we in England argue in this way. Coming much nearer home, we could not even accept the case of Northern Ireland as a completely valid precedent, where trade conditions, though largely similar to those obtaining here, are not perhaps exactly so.

The " Cream Ice Plan "

However, since standards on the American pattern have been proposed for this country in the past—the author understands that no organisation has any official proposals at the moment—it is only proper that they should be examined. Taking as being typical what may be called the " Cream Ice Plan ", which attracted some attention before the war, this differed in only one respect from the former 8 per cent. ice cream standard of the Ice Cream Association, but that one respect was not unimportant, and the plan represented a certain improvement on the other.

In effect, this plan was that an 8 per cent. milkfat standard should be applied to a product to be defined not as " ice cream " but as " cream ice ", leaving the name " ice cream " to be used, as in the past, of products less rich in milkfat down to a minimum of 3 per cent. Many people were inclined to favour this plan as seeming to offer a practical way out of the difficulty which would be created for many of the smaller traders if an 8 per cent. " ice cream " standard were established, under which sub-standard products, like the average custard-type article, would have to be sold under some name other than " ice cream ". On further and very full consideration, however, the advantages of this plan—the " Cream Ice Plan "—seemed to be far more apparent than real.

It is instructive to consider what would happen if such a plan were put into effect. Those who had always made an 8 per cent. or richer ice cream would, of course, continue to do so, only now they would put forth their product glorified by the name of " cream ice ". At the other end of the scale the three-percenters would naturally go on three-percenting, rejoicing in the privilege of being allowed to continue to call their produce " ice cream ". Midway between the two would be a small but honourable company of others, four-percenters, five-percenters, and so on. Those nearer the top, the six- and seven-percenters, seeing no point in staying where they were, would carefully weigh up the matter and, with a sigh of resignation, would probably decide to make the climb to the dizzy heights of the " cream ice " makers. The four- and five-percenters, after an uncertain glance up and down, would decide either to stay where they were, or, more probably, to make the little jump to the bottom.

Thus we should all be in much the same position as before; rather worse, in fact, since, though there would still be the same two extremes, there would be no mean. Beyond heaving up from the depths a few of the less abandoned one-percenters and two-percenters, the standard would accomplish nothing. The level of quality among the low-fat products would be raised only in a few cases, and then only to the legal minimum, which, of course, would represent precisely the same level on which most of the low-fat products had stood before. It might, of course, be suggested that this " Cream Ice Plan " could well be adapted to the author's scheme for a 5 per cent. " ice cream " standard. It could, and it might be considered desirable that it should. The results would certainly be different from those just commented upon. But, beyond complicating the scheme by introducing another category, what particular purpose would it serve? It is unlikely that many of the " ice cream " makers would push up their milkfat another 3 per cent. for the mere privilege of being allowed to turn the name of their product the other way about.

MINISTRY OF FOOD

LATEST STATUTORY RULES AND ORDERS

The list given below is the continuation of the list of Orders published in *Food Manufacture*, December 1, page 276.

No.	*Date.* 1941.	
		PRICE FIXATION ORDERS
1530	Sept. 30.	The Flour (Maximum Retail Prices) Order, 1941. (1d.)
1531	,, 30.	The Oat Products (Control and Maximum Prices) Order, 1941. (2d.)
1541	Oct. 1.	Order Amending the Home-Grown Dredge Corn (Control and Maximum Prices) Order, 1941. (1d.)
1542	,, 1.	The Bread (Control and Maximum Prices) Order, 1941. (1d.)
1543	,, 1.	General Licence under the Bread (Control and Maximum Prices) Order, 1941. (1d.)
1544	,, 1.	The Home-Grown Beans (Control and Maximum Prices) (Northern Ireland) Order, 1941. (2d.)
1553	,, 4	General Licence under the Bread (Control and Maximum Prices) Order, 1941. (1d.)
1554	,, 4.	Order Amending the Bread (Control and Maximum Prices) Order, 1941. (1d.)
1576	Sept. 8.	Order amending the Barley (Control and Maximum Prices) Order, 1941. (1d.)
1577	,, 8.	The Macaroni and Similar Products (Maximum Prices) Order, 1941. (1d.)
1578	,, 8.	The Onions (Maximum Prices) Order, 1941. (2d.)
1603	Oct. 11.	Order amending the Bread (Control and Maximum Prices) Order, 1941, and prescribing the date upon which the provisions of Article 5 thereof shall come into force. (1d.)
1605	,, 11.	The Technical Tallows and Greases (Home Melt) (Maximum Prices) Order, 1941 (1d.)
1619	,, 15.	The Barley (Control and Maximum Prices) (Northern Ireland) Order, 1941. (2d.)
1620	,, 15.	The Cereal Breakfast Foods (Control and Maximum Prices) Order, 1941. (1d.)
1636	,, 18.	The Imported Apples (Maximum Prices) Order, 1941. (2d.)
1637	,, 18.	Order amending the Home-Grown Apples (Maximum Prices) Order, 1941 (1d.)
1639	,, 18.	The Mincemeat and Fruit Curd (Control and Maximum Prices) Order, 1941. (2d.)
1655	,, 22.	The Egg Products (Control and Maximum Prices) Order, 1941. (1d.)
1663	,, 23.	Order amending the Threshed Home-Grown Peas (Control and Maximum Prices) Order, 1941. (1d.)
1664	,, 23.	General Licence and Directions, under the Home-Grown Wheat (Control and Prices) Order, 1941. (1d.)
1666	,, 23.	The Eggs (Control and Prices) (No. 3) Order, 1941. (3d.)
1678	,, 25.	Amending the Feeding Stuffs (Maximum Prices) Order, 1940. (1d.)
		FOOD SUBSTITUTES
1606	Oct. 11.	The Food Substitutes (Control) Order, 1941. (1d.)
1606	,, 11.	The Food Substitutes (Control) Order, 1941, prohibits the manufacture of food substitutes, by way of trade, except under licence or authority of the Minister. A food substitute may be sold only in the container in which it was sold by the manufacturer, and under the manufacturer's label and description. From November 10, 1941, no one may sell food substitutes unless they have been manufactured under a licence granted under the Order by the Minister. "Food Substitute" means any preparation or product offered, or purporting to be capable of being used as a substitute for any food.
		FEEDING STUFFS
1651	Oct. 21.	Order amending the Compound and Mixed Feeding Stuffs (Control) (No. 2) Order, 1940. (1d.)
		MILK
1604	Oct. 11.	The Milk (Scheme of Supply) Order, 1941. (2d.)
		VEGETABLES
1673	Oct. 24.	The Drying of Vegetables (Licensing and Control) Order, 1941. (1d.)
		GENERAL
1580	Oct. 8.	Order amending the Food (Restriction on Dealings) Order, 1941, and the General Licence dated September 10, 1941, under that Order. (1d.)
1634	,, 17.	Directions under the Sale of Food (Public Air Raid Shelters) Order, 1941. (1d.)
1635	,, 18	Order amending the Directions, dated January 6, 1940, made under the Rationing Order, 1939, as amended, and amending the Tea (Rationing) Order, 1940, and the Cheese (Rationing) Order, 1941. (1d.)
1638	,, 18.	Order amending the Preserves (Rationing) Order, 1941. (1d.)
1665	,, 23.	Directions under the Sale of Food (Public Air Raid Shelters) Order, 1940. (1d.)
1672	,, 24.	Amending the Food (Restrictions on Meals in Establishments) Order, 1941. (1d.)

CANADIAN APPLE JUICE

The Canadian Department of Agriculture officials have predicted that more than 2,000,000 gallons of apple juice will be canned this year, establishing a record for one of Canada's youngest and most promising fruit industries.

In the season 1937-38 about 128,000 gallons were canned, according to departmental records, and as the product caught the public taste the amount jumped in the next year to 900,000 gallons. Last year the total was 1,500,000 gallons.

In Canada, as in this country, the development of a suitable lacquer for the cans and also the adoption of flash pasteurisation has put the industry on a sure basis.

To get the best taste and bouquet it is usual to blend three or four varieties. In Eastern Canada well-ripened McIntosh apples are blended with Stark, Spy, Ben Davis, and other varieties. In British Columbia blends of McIntosh, Jonathan, Newton, Winesap, Delicious and some others are used.

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in FOOD MANUFACTURE should not be taken as an indication that they are necessarily available for export.

NEWS FROM THE INDUSTRY

Export and Transhipment Control

Under the terms of Board of Trade Orders made in December which came into force with immediate effect, all Export and Transhipment Licenses for goods consigned to any of the following destinations have been revoked:

Japan (including Karafuto), Chosen (Korea), Manchuria, Kwangtung Leased Territory, Taiwan (Formosa) Japanese Mandated Islands, Japanese Islands, China, except via the Burma Road, Macao, Portuguese Timor, Thailand, French Indo-China.

The Orders (S.R. & O. 1941, No. 1968 and S.R. & O. 1941, No. 1969) are on sale at H.M. Stationery Office and through booksellers.

* * *

Sugar Beet Contracts

Farmers who, before December 27, contract to grow sugar beet next year for their nearest factory are entitled to have their contracts accepted by that factory. This arrangement guarantees growers against the higher transport rates involved in sending sugar beet to more distant factories and should encourage farmers to plan now for an increased acreage.

The factories will accept such offers up to the limit of their capacity to deal with deliveries by road, and when the total "road" contracts reach this point they will accept subsequent contracts for delivery by rail.

It is important that offers shall be made to the local factories without delay.

* * *

Delays Caused at Ports

Failure to comply with licensing requirements in respect of goods brought from abroad for transhipment at United Kingdom ports is causing unnecessary delay and impeding work at the ports.

The Board of Trade point out that licences issued by the Import Licensing Department are required not only for nearly all imports but also for cargoes, with exceptions, brought to United Kingdom ports and entered with the Customs as in transit or for transhipment elsewhere.

Goods requiring licences arriving without them are liable to seizure. Applications for such licences should be made before shipment of cargoes and must be made by a firm or individual resident in the United Kingdom.

* * *

Resignation of Mr. A. G. Short

Mr. A. G. Short, Director of Manufactured Meat in the Ministry of Food, has tendered his resignation, which Lord Woolton has reluctantly accepted.

Mr. Short has been Director of Manufactured Meat (unpaid) since October, 1939. He recently intimated that the work for which he volunteered had reached a stage at which he could relinquish his appointment.

Oilcakes

Supplies of certain oilcakes have been recently augmented and are now available against coupons. Under war conditions, quantities of imported feedingstuffs vary from time to time; at the moment, undecorticated groundnut cake, palm kernel cake and extracted palm kernel meal are relatively plentiful.

Undecorticated groundnut cake is as rich in protein and oil as linseed cake. It has consequently a much higher feeding value than undecorticated cotton seed cake, although it lacks the binding properties for which the latter is specially popular at certain seasons. It is a wholesome food for milk cows, fattening cattle and sheep.

Palm kernel cake and extracted palm kernel meal, although classed as "low protein cakes" available against the cereal ration coupon, are equal in nutritive value to linseed cake. The meal, in particular, is less palatable and needs to be used in small quantities until the animals get used to it. The composition of palm kernel cake is almost that of a milk production ration, so that it may be added to any other milk production mixture without disturbing its balance. For the "steaming-up" or reconditioning of animals it is specially suitable. Both cake and meal are safe food for cows, other cattle, pigs and even horses. For pigs and horses the quantity should not exceed 10 to 20 per cent. of the ration. When fed out of doors the troughs must be kept sweet. The cake store should be dry, as moist cake or meal is very unpalatable.

Further information on the use of these feeding-stuffs is given in "Growmore" leaflets, obtainable free on application to the Ministry of Agriculture, Lindum Hotel, St. Annes, Lancs.

* * *

Manufacturers and Points Rationing

With the introduction of Points Rationing on December 1, manufacturers in the United Kingdom of canned tongues, canned meat roll or galantine and canned ready or prepared meals will no longer be able to sell these products except under the provisions of the Points Rationing Scheme.

The Ministry of Food has already circularised all manufacturers who receive a special allocation of manufacturing meat for canning purposes, informing them of the requirements of the scheme. If any manufacturer of these commodities is still not clear about his obligations he should immediately consult his Area Canned Meals Officer, whose name and address is available at the local Food Office.

Manufacturers of these products who have not received the special circular referred to above, should write to the Ministry of Food, Meat and Livestock Division, Rydal Mount, Colwyn Bay.

Industrial Accident Prevention

The first training course for industrial accident prevention organisers ever held in this country, arranged by the Royal Society for the Prevention of Accidents on behalf of the Factory Department of the Ministry of Labour and National Service, was such an outstanding success that a second course is being held at Balliol College, Oxford, from January 2-13, 1942.

The syllabus covers every aspect of industrial accident prevention and over twenty lecturers will take part. All are acknowledged experts on their particular subjects and are drawn both from the Factory Department and from firms with extensive experience of accident prevention organisation. Particular efforts are directed to giving trainees a solid grounding in the now extensive technology of the subject as well as in organisation and the law.

The course is residential; lodging and lectures thus being under one roof, the maximum amount of time can be given to intensive instruction. About 50 trainees, nominated by their employers, will be accommodated.

Programme and syllabus on request from ROSPA, 52, Grosvenor Gardens, London, S.W. 1 or 426, Strand, Cheltenham, Glos.

* * *

Cane Sugar Production

In the House of Commons recently, Mr. David Adams (S. Consett), asked the Under-Secretary of State for the Colonies whether the sugar interests in the various West Indian islands have now been united in the British West Indies Sugar Association; whether, as Jamaica is the only colony with a cost-of-living wage agreement, it is intended that labour conditions throughout the islands will be made uniform by bringing lower standards up to the highest wage, and what results the recent conference has had upon the Government's Sugar Purchasing Scheme?

Mr. George Hall (Under-Secretary): My noble friend (Lord Moyne, Colonial Secretary) understands that it is proposed to establish a West Indies Sugar Association with headquarters at Trinidad for the purpose of consultation on matters of mutual concern, such as research and scientific work and the various other aspects of the development of the sugar industry in the West Indian area.

The maintenance and improvement of the standard of living of the labouring population is under the constant review of the Governments concerned and of their Labour Departments, as well as of the trade unions, but circumstances vary so widely in the various colonies that complete uniformity of labour conditions is difficult to attain. The formation of an Association will not affect the sugar purchases of Government in any way.

South African Delegation

Early in December, Senator P. A. Myburgh, Mr. P. V. Pocock, M.P., and Mr. F. H. Acutt, M.P., a South African Parliamentary delegation, visited Lord Woolton at the Ministry of Food and discussed food problems of interest to South Africa and the United Kingdom.

* * *

Eire Ban on Confectionery Exports

In Eire there are still occasional grumbles from confectionery and chocolate manufacturers in regard to sugar supplies, and especially in respect of the irregularity of the stocks being delivered (says *Confectionery News*).

With chocolates and sweets in short supply in Great Britain and Northern Ireland, the export trade done by both manufacturers and retailers in Eire has increased enormously during the past two years. People from Northern Ireland, especially, made special trips to Dublin and to Dundalk, near the border, and brought back large packages of these goods, regardless of the Customs inspectors. Eire was disinterested, because it meant more revenue, but now, with sugar and other raw material imports becoming problematic, persons travelling from Eire to visit friends in Great Britain or Ulster can no longer take with them, as part of their luggage, chocolate, sweets or other confectionery, nor can these commodities be sent outside Eire by parcel post.

* * *

Fire Prevention (Business Premises) (No. 2) Order, 1941

An explanatory memorandum for the guidance of appropriate authorities, occupiers of factories, offices, shops and other business premises, and persons working at those premises, with a foreword by the Right. Hon. Herbert Morrison, M.P., Home Secretary and Minister of Home Security, and the Right Hon. Thomas Johnston, M.P., Secretary of State for Scotland, has been issued by the Ministry of Home Security and the Scottish Home Department.

Experience gained in the working of the Fire Prevention (Business Premises) Order, 1941, quickly showed that there was a need for an explanatory memorandum setting out in simple language the obligations imposed by the Order. Such explanatory memorandum was duly published. The No. 2 Order restates those portions of the earlier Order which it has been decided to retain and includes the changes which have now been agreed upon.

The memorandum is mainly composed of a detailed description of the provisions embodied in the Order.

* * *

Casings for Sausages

Since there is likely to be a shortage of hog casings, both imported and home-produced, during the next three or four months, all meat manufacturers and butchers are advised by the Ministry of Food to use sheep casings for sausages whenever possible.

Gifts from Abroad

Gifts sent to this country from abroad are allowed entry, without import licence, on condition that they are *bona fide* unsolicited gifts sent by parcel post and provided that no parcel exceeds 5 lb. gross weight or, if it includes food, contains more than 2 lb. of any one foodstuff. All parcels must be clearly marked as gifts. The Board of Trade points out that the receipt of gifts at frequent intervals cannot be permitted.

* * *

British Standards Institution

At a recent meeting of the Chemical Divisional Council of the B.S.I., Dr. E. F. Armstrong, F.R.S., who has been Chairman of the Divisional Council since its formation some ten years ago, retired from the Chairmanship and Mr. Roger Duncalfe, President of the A.B.C.M., was appointed to succeed him.

Dr. Armstrong has for some time desired to be relieved of the Chairmanship, particularly as he is fully occupied at the present time as Chemical Adviser to the Ministry of Home Security.

It was due to Dr. Armstrong that the Chemical Industry threw in its lot with that of the B.E.S.A., as it was then called, and co-operated in the enlargement of the scope of the standards organisation to include, as it now does, the major industries of the country. The successful issue of the conference which took place between the B.E.S.A. representatives and those of the Chemical Industry was due in large measure to Dr. Armstrong's diplomatic handling of what was undoubtedly a matter fraught with many difficulties, and as Chairman of the Chemical Division he has been responsible for the successful development of national standardisation in the chemical field. It will be recollected that he was Chairman of the B.S.I. in 1934 and 1937. He is Chairman of the Finance Committee of the Institution, and indeed, since the widening of its scope under its new title the B.S.I. has owed much to Dr. Armstrong's ability and foresight.

The institution is fortunate in having secured Mr. Roger Duncalfe, President of the Association of British Chemical Manufacturers, as Dr. Armstrong's successor. Mr. Duncalfe has for many years past been one of the leading spirits in the Glue and Gelatine Industry and a prominent mover in the organisation of that industry both before and since the outbreak of war. The Chemical Divisional Council will, therefore, have a Chairman with a wide experience of industry and organisation, under whose guidance it can be assured of a future of achievement and progress, both valuable and useful to the Industry.

* * *

The British Standards Institution announces that, in view of the continuing expansion of the work of the Institution and the development of its relations with the Government Departments and with standardising authorities overseas, the General Council has appointed an Executive Committee under a permanent Chairman.

The Executive Committee will keep all the activities of the Institution under review and report to the General Council from time to time as may be necessary.

Mr. C. le Maistre, C.B.E., who has been connected with the movement almost since its initiation, and who for the past twenty-five years has been its chief executive officer, has been appointed full-time Chairman of the Executive Committee, and Mr. P. Good, C.B.E., for several years Deputy Director and recently Joint-Director, has been appointed Director and Secretary of the Institution.

* * *

Factory Time Recording

Time recording and time keeping is an important item in any modern industrial concern. The new Magneta Time Recorder brings efficient time control to every type and size of business. It is compact, being one-fourth the size of previous models, requires only one hand to operate it, and is faster and more convenient for employees. It prints full time records upon standard time cards.

In the installation of time recording equipment it is essential that accurate and synchronised time keeping is maintained at all times throughout the factory, and, due to the variations in the frequency of A.C. mains controlled equipment, it is strongly recommended that a master clock controlled system should be employed operated from batteries and trickle-charged from the mains supply. This system will continue to operate in the event of mains failure until such time that the mains are put into service again.

A further development which is worth considering is the question of the relay of time signals for "on and off" breaks. Such signals can be operated from a programme instrument, either running from the mains supply or preferably master clock controlled with the necessary facilities for switching in bells or buzzers at pre-determined times.

In a large number of factories a loud-speaker system can be utilised apart from its other services, such as A.R.P. control, staff location, music-while-you-work, for the purpose of radiating time signals at very little additional cost, cutting out the installation of either bells or buzzers.

The Magneta Time Company give technical advice and assistance on matters concerning time recording and sound broadcasting equipment.

* * *

Mr. H. E. Bailey

Mr. H. E. Bailey, of Sheffield, who for the past three years or more has been President of the N.U.R.C., and has rendered outstanding services in that capacity, and as secretary of the trade's War Relief Fund, has relinquished his office to undertake a responsible post under the Ministry of Food.

Canning Hill Mutton and Lamb

In the House of Commons recently, Major Lloyd asked the Secretary of State for Scotland whether experiments have been undertaken with the canning of hill mutton and lamb; and whether the results have been satisfactory.

Mr. Johnston: The experiments in question, so far as quality, nutrition and attractiveness to the palate are concerned, have proved very successful indeed. I am awaiting particulars as to costs, etc. I trust that the firm of canners who have conducted the experiments will be able to lay evidence before the Committee of Inquiry upon Hill Sheep Farming presided over by Lord Balfour of Burleigh.

Major Lloyd: Are there not ample facilities for large-scale production once experiments are complete?

Mr. Johnston: I think there are adequate opportunities available if proper organisation in the industry can be secured.

* * *

Sugar Beet Prices

The "basic" price for sugar beet, which was 61s. 6d. per ton for the 1941 crop, has been fixed at 75s. for next year's crop. This price is for beet having a sugar content of 15½ per cent. delivered to East Anglian factories of the British Sugar Corporation. Slightly higher basic prices have been fixed for the other factories.

Prices will vary according to the sugar content of the beet, but as the average of this country is considerably higher than 15½ per cent., it is anticipated that the basic prices now fixed should give farmers as a whole an average gross return of something more than 80s. per ton of beet delivered.

The material increase has been made in recognition of the difficulties which beet growers encounter under present conditions, and of the necessity of fully utilising factory capacity for the production of sugar in 1942. The prices do not take account of the decision now reached by the Agricultural Wages Board to increase the minimum wage as from December 28, and a further announcement may, therefore, be expected at an early date.

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Baldwins Limited

The London address of Baldwins Limited is now:

Registered and Head Office: P.O. Box No. 255, 6, Broadway, Westminster, London, S.W. 1. Telephone: Abbey 1853. Telegrams: Balwinza, Sowest, London.

London Sales Office: P.O. Box No. 255, 6, Broadway, Westminster, London, S.W. 1. Telephone: Abbey 1858. Telegrams: Promptitude, Sowest, London.

* * *

New Bakery

A new bakery of the East Lothian Co-operative Society commenced operations last November. The new premises replace the bakery which was destroyed by fire some time ago.

A Semi-Automatic Seaming Machine

A Semi-Automatic Seaming Machine has recently been introduced by Perkin and Co., Limited. It can be adjusted to cover a large range of diameters and depths, viz.: Diameter from 1½ in. to 6 in., Depth from 1½ in. to 24 in. The change over to any size within this range takes from five to seven minutes.

The drive is self-contained and consists of Crompton-Parkinson A.C. Ball-bearing Motors for any voltage (or D.C. at extra charge).

All movements of the machine are entirely automatic and continuous and the output is controlled by simple adjustment from any speed from 25 to 40 containers per minute.

Another interesting item is an Automatic Lid-curling Machine designed for the rapid curling of press-stamping of various types used in the production of round tinplate or composite containers.

There is an increasing demand for curled edges to slip lids. This operation is efficiently performed on the machine. The range of sizes which may be treated covers all stamping from 1¼ in. to 4½ in. diameter.

* * *

New Weighing and Pressing Machine

Certain materials, such as coffee, require pressing after filling; a new weighing machine with pressing attachment (made by The Automatic Weighing and Packing Machine Co.) does both operations. The tins are fed by hand into the rotary feed table and rotated into the filling position. After filling, it is taken to the next stage for pressing; a third stage ejects the filled container ready for lidding and sealing. Many new features make this machine the most up-to-date of its type; the filling, pressing, and ejecting taking place at the same time give a greatly increased speed. The same machine can also be supplied fully automatic with adjustable inlet and outlet conveyors for feeding and taking away the tins.

* * *

Efficiency in the Use of Fuel

At the request of the Mines Department of the Government, a series of meetings has been arranged jointly by the following Societies:

Institution of Civil Engineers.
Institution of Mechanical Engineers.
Institution of Mining Engineers.
Institution of Electrical Engineers.
Institute of Chemistry.
Iron and Steel Institute.
Institution of Gas Engineers.
Society of Chemical Industry.
Institution of Chemical Engineers.
Institute of Fuel.

The object of the meetings is to inaugurate an open discussion on the best ways and means of improving the efficient use of fuel and power in existing industrial plants under present conditions and to invite constructive suggestions. The first meeting took place on December 16 and further ones are being held as follows:

On *Saturday, January* 3, at 2.30 p.m., in the Large Theatre, H. W. Wills Laboratory, Royal Fort, Bristol. The Chair will be taken by Sir Richard Redmayne, K.C.B., M.Sc., M.Inst.C.E., the opener of the discussion being Mr. J. G. Bennett, F.Inst.F., Member of the Fuel Efficiency Committee of the Mines Department.

On *Thursday January* 8, at 2.30 p.m., in the Lecture Theatre of the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C. 2. The Chair will be taken by Sir Harold Hartley, C.B.E., M.C., F.R.S., Chairman of the Fuel Research Board, the opener of the discussion being Dr. E. S. Grumell, D.Sc., F.Inst.F., Chairman of the Fuel Efficiency Committee of the Mines Department.

Friends of Members are cordially invited to all these Meetings, tickets for which are not required.

* * *

Lighting Aids Production

The importance of scientifically planned lighting as an aid to production is a subject which must be of interest to every executive responsible for output. Results have proved that quantity of light alone does not necessarily lead to efficiency, but that the correct placing of light to provide maximum illumination at the point of operation speeds production and reduces fatigue by eliminating eye strain.

This is a subject on which lamp makers have carried out a considerable amount of research, and an interesting brochure has just been published by the makers of Ecko lamps. Besides outlining the purpose of Ekco Light Planning, the publication offers free advice on industrial lighting problems.

A copy of the folder can be had from E. K. Cole Ltd., Lighting Research Department, Southend-on-Sea.

* * *

Averting Machinery Breakdown

Every works manager at present realises only too painfully that spare parts and replacements for all kinds of mechanism are obtained only with difficulty and delay. Obviously, therefore, anything which will prevent or even postpone the breakdown of essential machinery is something to be seized upon with avidity.

A skilled and specialised inspector will carefully note where strain or wear has taken place, and he will be able to judge if the condition can be allowed to continue for a limited time or whether there is a risk of early breakdown.

Morris Inspection Engineers have proved their worth, wherever lifting and transporting machinery are in use. They never trespass into other fields, but specialise in cranes, hoists, lifts, pulley-blocks, runways, chain-slings and other associated gear.

They are thoroughly familiar with the requirements of the Factories Act of 1937, but their recommendations are not limited to mere compliance with legalities.

COMPANIES

United Dairies Limited

The Twenty-sixth Ordinary General Meeting of United Dairies, Ltd., was held in November.

Mr. Joseph H. Maggs, the chairman, presided.

In the course of a long report, which had been circulated to all shareholders with the report and accounts and was taken as read, Mr. Maggs said:

"Liquid milk sales in London fell steeply at the beginning of the war but recovered gradually until September, 1940, when, aided by the National Milk Scheme, sales approached the pre-war level. Then came the intense air raids and sales fell back rapidly, but began to recover again at the beginning of this year and reached a satisfactory level at the end of March. The restriction of milk sales in order to conserve milk for cheese making then came into force and sales were reduced greatly until the Minister of Food announced within a few weeks that there was to be no cut in sales to households taking one pint or less per day. The relaxation of the Order meant an increase in sales again.

You will have seen, no doubt, that the Ministry of Food have been preparing plans to ensure equitable distribution in case of shortage of liquid milk this winter. We concur gladly in the proposal to secure priority of supply to the growing generation, but any scheme to allocate milk to dairymen on the basis of their adult registrations alone is, in our view, a mistake, and would be administratively impracticable.

The habits of liquid milk consumption differ very widely between different areas, and, in our view, any workable scheme of restricting consumption must take this fact into consideration. We are glad to co-operate to the best of our ability with the Ministry of Food, and the fact that milk consumption—taking the country as a whole—has not only been maintained but has reached record figures after two years of war is in itself a remarkable tribute to the effective handling of the supply by the Ministry, and to the efforts of the dairy farmers to maintain milk production in face of two of the worst winters in memory."

* * *

J. H. Packer and Co.

The meetings to consider the capital scheme of J. H. Packer and Co. (cocoa and chocolate manufacturers) were held at Bristol recently.

A circular issued by a Preference shareholder observes that "the company's trading position during the years 1938, 1939 and 1940 has steadily improved (the profits in these years were respectively £4,019, £19,447 and £47,516), so that as matters now stand the Preference shareholders are clearly entitled to expect not only that payment of their Preference dividends should be resumed but also that the arrears of dividends should be rapidly paid off".

The directors' circular explaining the scheme showed that the above-mentioned profit figures were before taxation. After taxation the profits were: 1938, £3,554; 1939, £9,684; and 1940, £27,155. In addition to the immediate payment of two and a half years' arrears on the Preference shares as soon as the scheme goes through, the plan provides for Preference holders receiving about 13 per cent. of the equity capital as consideration for foregoing eight years' Preference arrears. The interest rate of 5½ per cent. is not to be altered and other preferential rights are untouched.

(*The Financial Times.*)

* * *

United Canners

In a notice to shareholders, the directors of United Canners, Ltd., state that, as a result of present conditions, a big strain has been placed on the company's financial resources.

They have thought it advisable to take the precaution of increasing the borrowing powers of the company to twice the amount of the issued share capital. For this purpose it is necessary to alter the Articles of Association and a meeting will be held for that purpose on December 15.

Arrangements have already been made to obtain the additional finance, should it be found necessary, the directors add.

The present authorised capital of the company is £300,000 in 1,200,000 shares of 5s. An amount of £140,000 has been issued and paid. The shares were last dealt in around 4s. 9d.

* * *

Foster Clark Limited

The annual general meeting of Foster Clark, Limited, was held on December 2. Mr. Henry C. Clark, J.P., chairman of the company, presided.

In the course of a statement which had been circulated with the report and taken as read, Mr. Clark said that the report and accounts for the year ending September 17, 1941, show a trading profit, after provision for Excess Profits Tax, of £98,408, compared with £63,934 in the previous year. The income from investments at £31,205 shows a decrease of £301.

The combined trading profit and investment income amounts to £129,613. After deducting war risks insurance, £9,874, air raid precaution expenditure, £5,295, and directors' fees, £2,500, a balance is left of £111,944. This added to £60,372 from the previous year gives a total of £172,316. Dividends already paid absorb £33,750 and your directors recommend that the balance should be apportioned as follows: A final dividend on the Ordinary stock of 12½ per cent., £43,750 (makes a total for the ninth year in succession of 20 per cent.). Provision for income-tax, £30,000, should more than cover taxation on all the company's profits up to date. Transfer to contingency reserve £4,000. Balance to be carried forward to next year £60,816.

Referring to the prospects for the coming year, Mr. Clark said that nearly three months have passed, with satisfastory results. The final result of the year will depend largely upon whether, in the meantime, production is uninterrupted, and what supplies of raw materials we can get. Although some of these are in short supply, particularly sugar, it is to our advantage that the Ministry of Food definitely recognises the desirability of a varied diet for the community, especially now that some of the staple foods are of necessity severely rationed. Owing to the small fruit crop and the consequent Government restriction, in order to secure more jam, our output of canned fruit has been greatly reduced, but that of vegetables increased.

* * *

Brooke Bond Interim

Brooke Bond and Co., the wholesale tea dealers, is again maintaining its interim dividend on the £600,000 capital at 5 per cent., less tax. The company has paid a total of 10 per cent., less tax, for at least eleven successive years.

* * *

War Damage Insurance

The majority of the work undertaken by Fuller, Horsey and Cassell in recent months has been for War Damage Insurance purposes. It is found that the possession of an independently prepared schedule of such plant assets can be of considerable assistance in the event of a concern suffering from air raid damage and in any case a valuation helps to assure that the cover for this compulsory insurance is on a sound basis. A case in point, which might be of interest, occurred some months ago when the week following the completion of a detailed schedule of a food manufacturing plant, a substantial part of the works was completely destroyed and the directors concerned were considerably relieved that their foresight had saved them from the necessity of preparing the claim from memory.

* * *

Charles Haller Limited

Charles Haller Limited, specialists in quality coffees, have recently been awarded the Certificate of the Royal Institute of Public Health and Hygiene for the purity and quality of their blends of coffees. This award is only given after analysis of the product and when the Council of the Institute is satisfied that the claims of the makers can be fully substantiated and that in the preparation of the product due regard is paid to the requirements of public health and hygiene.

Messrs. Hallers' offices and warehouse in Mincing Lane were totally destroyed by fire on the occasion of the last big London blitz, and they are now fully installed at The Hermitage, Wimbledon Common, S.W. 19, from where they will continue to conduct their business for the duration of the war.

INFORMATION AND ADVICE

Preserving Rhubarb—Piccalilli—Information Supplied

Preserving Rhubarb

7,476. *I am anxious to know of a satisfactory method of preserving young rhubarb sticks, without the addition of sugar. I believe that bottling in jars containing a solution of salicylic acid is a method adopted for some fruits and would be glad to know if this would also be suitable for rhubarb, and, if so, what is the correct strength of the salicylic acid solution?* (Loughborough.)

The best way to preserve rhubarb without sugar is to cut up the sticks into about 3-inch pieces and place them in water in the bottles. The bottles are closed with special caps. The bottles and their contents are then sterilised up to 150° F. in 1 hour; up to 175° F. in ½ hour; hold 10 minutes.

You may not use salicylic acid as a preservative for commercial purposes. The *Lancet*, July 20, 1940, published some experiments made by Good Housekeeping Institute from which some recipes were evolved. In one recipe for jam the use of salicylic acid was indicated, but this recipe was solely intended for domestic use.

If you carry out in a proper manner the sterilising process given above you will have no need to have resort to preservatives of any kind.

Piccalilli

7,923. *We are interested in the manufacture of Piccalilli, and would be pleased if you could furnish us with a recipe.* (London.)

The following typical recipe will serve as a base for experiments:

PICCALILLI LIQUOR.

16 gr. vinegar	48 gal.
Best mustard	36 lb.
Gum tragacanth	6 ,,
Turmeric	3½ ,,
Curry powder	1 ,,
Ground ginger	1 ,,
Table salt	7 ,,
Fine chopped shallots	4 ,,
Fine chopped garlic	1½ ,,
Granulated sugar	20 ,,

Place 6 lb. of gum tragacanth in 12 gal. of 16-gr. vinegar and allow to stand for 24 hours, stirring up two or three times. Now put the rest of the vinegar in an enamelled pan; rub the gum into it through the sieve. Now add the sugar, salt, garlic, and the shallots, and stir well. Then add the spices, turmeric, and mustard through a fine sieve, and gently bring to the boil, simmering for 15 minutes. Pass the whole through a sieve into a tub, and allow to stand until cold; after which, stir.

VEGETABLES FOR BEST PICCALILLI.

Cauliflower	1 cask
Bastards	⅛ ,,
Chumps	⅛ ,,
Beans	1/12 ,,
Gherkins	1/10 ,,
West Indian pickle	1 gal.
Garlic, very fine	1 ,,
Mangoes, very fine	1 ,,
Pickled lemons	1 ,,
No. 0 silver skin onions	⅛ cask

Obviously some of these ingredients will not be now available, and substitutes (if any) must be used.

Information Supplied

7,279. *I seek information on turnips and mangel-wurzels which were used in the last war in the making of jams and marmalades.* (London.)

This enquiry was published in FOOD MANUFACTURE, December, 1941, and emanated from a subscriber who wanted a *domestic* recipe, suggestions for which were given, as stated.

It is possible that some misunderstanding may have been produced by this enquiry and the reply thereto. As it is a matter which affects the prestige of British-made products, we lay stress on the fact that, so far as commercial jams are concerned, no such ingredients as the ones named in the enquiry were used by the manufacturers, nor have they been used since.

7,333. *We should be pleased if you could give us any information as to the suppliers of plant for drying vegetables and other foodstuffs, or put us in touch with anyone having such a plant, new or second-hand, for disposal.* (Leicester.)

Suggestions as to possible supplies were given.

7,334. *We shall be greatly obliged if you will be kind enough to let us know the manufacturers of powdered soluble coffee; we are interested in bulk quantities.*

Also, manufacturers of small tin containers and glass containers for packing same. (Glasgow.)

Names were given.

7,338. *Would you be good enough to let us have any information you may be in possession of regarding the manufacture of salmon paste for packing in bottles, or, alternatively, the people to approach?* (Leeds.)

Some suggestions were given and the names of an expert supplied.

7,341. *We have received a letter from one of our Empire preserve manufacturing friends, reading as follows: "The following is an extract from a report in the February issue of 'Conditions in the Food Business', a publication sponsored by the American Institute of Food Distribution. 'Process of concentration has been developed which would cut the required shipping space to 8 per cent. of fresh. This is a treatment which concentrates the juice by freezing; the ice crystals are then separated, resulting in 60 per cent. concentration. It is then heated, or sugar is added to attain a higher degree of concentration. The finished product is in a paste form and would be diluted with water on arrival in Britain.' The report deals with the marketing of Palestine's heavy surplus of citrus fruits due to the lack of transportation facilities.*

Would it be possible for you to secure more information for us regarding this special process?"

We shall be pleased to hear whether you can supply us with the required information. (London.)

Your friends would obtain not only the latest information on fruit juices in general, but the different methods of concentrating fruit juices by freezing, in a book called "Fruit and Vegetable Juices", by Tressler, Joslyn and March. The subject is, of course, too wide to be treated here.

7,342. *We have on hand an export enquiry for sausage filling machines. We shall be extremely obliged if you will advise us as to possible sources of supply in this country.* (London.)

Advice was given.

7,343. *We should be very much obliged if you would give us the name and address of the manufacturers of "Sugarol", which you mention in* FOOD MANUFACTURE. (London.)

This was given.

7,354. *We should be glad if you could supply us with the names of the manufacturers of machines for "dicing" carrots and other vegetables for canning.* (Birmingham.)

Names were given.

RECENT PATENTS

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Improvements in and Relating to the Obtaining of Fruit-Juice Products

Hitherto, when producing fruit juices and jellies by evaporation, sugar had to be added to the fruit juice so as, on the one hand, to render the product more durable, and, on the other hand, to diminish the sourness thereof, which might be so strong as to render the product unenjoyable. Often also the fruit was cooked to a jam with the addition of water, upon which sugar and gelatinising agents were added. Always, however, the addition of sugar was necessary in very considerable quantities. It has also been proposed, when dealing with mere fruit juices and not with concentrates proper, to add relatively sweeter juices to sour ones. By such a procedure alone, however, neither the undesired sourness nor the undesired taste are removed. By the process according to the invention this situation is fundamentally remedied.

According to the present invention the fruit juice is mixed with sufficient quicklime, slaked lime, milk of lime or lime water to make it alkaline, treated with CO_2 and filtered, whereupon clear fruit juice not treated with lime is added, the whole again filtered and evaporated with the addition of active charcoal, kieselguhr, fuller's earth or the like, whereupon the product is again filtered and then concentrated further. This process does not require the addition of sugar. Fruit juice obtained either by pressing or extracting the fruit itself serves as the initial product. The final product is a fruit juice or a concentrate thereof or, when a gelatinising agent has been added, a fruit jelly or powdered product. Thus, for example, a pear juice concentrate, from which acid and taste substances have been removed by the present invention, may be mixed with orange juice or other juices containing citric or tartaric acid. The pear juice concentrate is then given an orange taste, for example, which could not be obtained by mere mixing.

By admixing active charcoal, kieselguhr, fuller's earth or the like during the first evaporation the fruit sugars, which are very sensitive to heat, are preserved as much as possible, and the result is also obtained that the depositing of lime, which may still be contained in the juice in certain circumstances in the evaporators, is materially decreased. Undesired taste substances and colouring matter can also be removed by charcoal filters.

The lime salts of the fruit acids are partly soluble in water and can no longer be removed by means of carbonic acid. When it is required to remove this lime also, it may be precipitated by the alkali salts of carbonic acid, phosphoric acid or sulphuric acid. The calcium salts of the fruit acid are then simply converted into alkali salts. However, only a part of this lime may be precipitated—*e.g.*, by means of sodium phosphate. The final product is then eminently suited as a food containing calcium and phosphorus, since, for example, the easily soluble calcium malates are easily absorbed in the human body.

One may also adjust as desired the acidity of the concentrate by adding fruit juice which has not been treated with lime, or by the addition of fruit acids or other fruit juices. Extracts of other fruits, or of herbs, natural honey, artificial honey, malt, essences, drugs, etc., and, furthermore, albuminous substances may also be added after or during the evaporation so as to obtain the desired taste as well as certain medicinal effects. In this way a serviceable syrup, artificial honey or the like may be made, without adding sugar, from the rawest, tartest fruit juices, irrespective of the degree of evaporation or concentration.

Fruits contain fruit sugars and acids in varying degrees in accordance with their species, with the composition of the soil, with the climatic conditions, with their degree of ripeness, etc. Consequently it is necessary to adapt the process described correspondingly and change the quantity of any admixture as required.

537,741. Robert Gamper.

Latest Patent Applications

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.

9734. Falticzek, F. S.: Preparations for removing odours from fish foods when cooking.
9781. Richardson, A.: Fruit and vegetable driers.
9789. Beasley, H. H., and Beasley, French and Co., Ltd.: Containers for liquids.
9816. Boyle, F., and McConville, E.: Treatment of root crops.
9890. Thorpe, R.: Agricultural implements.
9923. Harkness, J. M., Scruby, B., and Harkness, G. K.: Hay-boxes.
9935. Mitchell, F. G.: Method of converting domestic refuse into fertilisers.
9979. Reynolds, F. R.: Means for planting potatoes.
10026. Laing, J. Fruit-preserving jars.
10067. Walkers Dairies, Ltd., and Humphries, E. L. E.: Emulsions for ice-cream, etc.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

539,255. Lawton, G.: Conching of chocolate.
539,258. Thompson and Norris Manufacturing Co., Ltd., and Paxton, A. M.: Packing-cases or boxes for bottles.
539,262. Sharples Corporation: Refining of fatty oils.
539,269. Chema Manufacturing Co., Ltd., and Sigmund, M.: Filters.
539,274. Kapella, Ltd., and Reason, R. E., and Garrod, R. I.: Apparatus for measuring and/or indicating small quantities.
539,298. Sorensen, S. P.: Poultry food.
539,305. Smith, F. D., and Milton, R. F.: Apparatus for analysing diets.

TRADE MARKS

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

RICHRAY.—614,640. Cocoa. **Dominion Tea Plantation Co., Ltd.**, Dominion House, 30, Redcross Street, Liverpool, 1. Tea Merchants (Associated.)

DAIRY MAIDEN.—614,657. Custard powder. **Searle and Cushnir, Ltd.**, 22, Billiter Street, London, E.C. 3; Merchants.

ZEP.—614,742. Meat extracts, jellies for food, jams, edible oils and fats, fruit and vegetable preserves, pickles, preserved or dried fruits and vegetables; and cooked fruits and vegetables packed in glass jars. **Rowntree and Co., Ltd.**, The Cocoa Works, Wigginton Road, York; Manufacturers and Merchants. Associated with No. 571,053 (3059) xlii. (By Consent.)

GOVA.—614,809. A preparation in liquid or powder form for use as an egg economiser or as a substitute for eggs. **Challen Bros., Ltd.**, Marlow House, Lloyd's Avenue, London, E.C. 3; Manufacturers. (By Consent.)

VIN-MIN-TA.—615,026. Food preparations (not for animals) consisting principally of yeast. **Vi-Products (Sheffield), Ltd.**, Hope Brewery, Claywheels Lane, Wadsley Bridge, Sheffield; Manufacturers and Merchants.

BENTIMA.—615,134. Dairy products (for food) and eggs. **The Bentima Co., Ltd.**, 17/18, Bury Street, London, E.C. 2; Manufacturers.

NEW COMPANIES

Hatherley and Son Limited. (365625.) To take over the bus. of bakers and confectioners cd. on at New Street, Burton-on-Trent, as "Hatherley and Son." Nom. cap.: £1,500 in £1 shs. Dirs.: A. Hatherley (permt. mang. dir.), Mildred Hatherley, Rachel M. Hatherley and A. E. Hall, all of 64, New Street, Burton-on-Trent.

Jaxsim Food Products, Limited. (366419.) Regd. April 8, 1941. 12, Queen Street, E.C. 4. Nom. cap.: £100 in £1 shares. Dirs.: J. Bard and S. Bard, both of 87, Stepney Way, E. 1; Cynthia Bard, 111, Crowland Road, N. 15.

Manorcream, Limited. (366573.) Regd. April 15, 1941. Lillies Chambers, 39, Albion Street, Leeds. To carry on the bus. of mnfrs. of and dlrs. in creams for use as food or as ingredients in food, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: E. A. Ramsden, 89, Smiddles Lane, Bradford; W. D. Roberts, Chapel House, Kilnsey, Yorks; C. Snowden, 621, Scott Hall Road, Chapel Allerton, Leeds; N. Ashworth, 26, Station Road, Baildon, Yorks.

John O. Martin, Limited. (366214.) Regd. March 31, 1941. 49, Church Street, Tewkesbury, Glos. To carry on the bus. of millers, flour mnfrs., corn factors, etc. Nom. cap.: £2,000 in £1 shares. Permt. mang. dir.: J. O. Martin, 49, Church Street, Tewkesbury, Glos.

Martin and Martin, Limited. (366239.) Regd. April 1, 1941. 61-69, Hoghton Street, Southport. To carry on the bus. of chemists, druggists, herbalists, mnfrs. of human and veterinary foods, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: R. W. Martin and Elizabeth J. Martin, both of 21, Roe Lane, Southport; R. Martin, 93, Roe Lane, Southport.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.

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MANESTY

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The Manesty Oscillating Granulator has a number of other uses than preparing material for tablet making, and we are now supplying a number to the Food Industry. This machine turns out granules of uniform size, its output is about 150 lbs. per hour and it thus very greatly reduces time and labour costs. It consists of a suitably geared oscillating stainless steel rotor which operates over a stainless steel wire screen. These screens are instantly interchangeable, depending on whether coarse or fine granules are required. Three stainless steel wire screens are provided with each machine—8, 10 and 12 mesh.

For the preparation of granules from powdered material the Manesty Oscillating Granulator is undoubtedly the most efficient and economical machine yet devised, and it can also be used for obtaining granules from lumpy or crystalline materials. By passing through a Manesty Oscillating Granulator the crystals, unless the material is very hard, are broken up and granules formed. In this way, effervescing salts can be granulated.

Besides granulating, breaking down, and in some cases screening, this machine is being used very successfully as a Mixer for materials that are inclined to "ball up".

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1. Gives uniform granules of any desired size.
2. Working parts are made of stainless steel, wear is minimised, and contamination of material eliminated.
3. Does the work of four to six operators at a fraction of the cost.
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Moist Material	... 150 lbs. per hour (approx.)
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Power required	... 1 h.p.
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[G]

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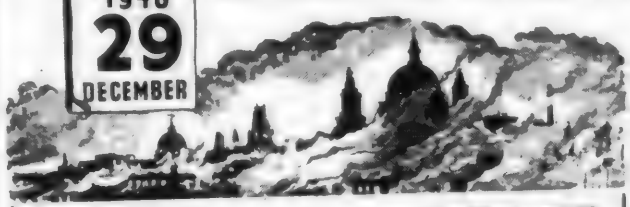

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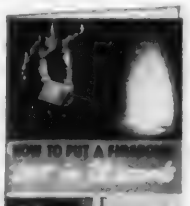

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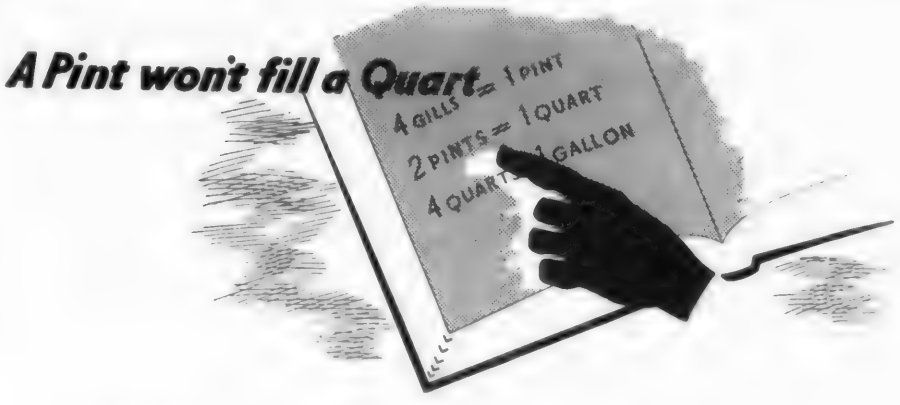

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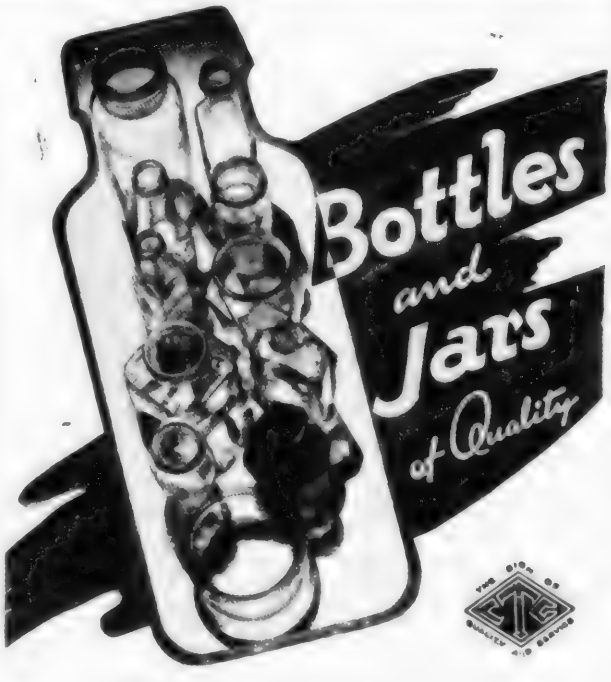

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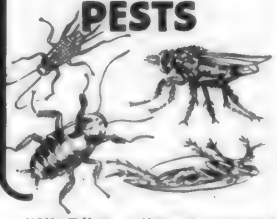

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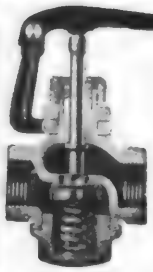

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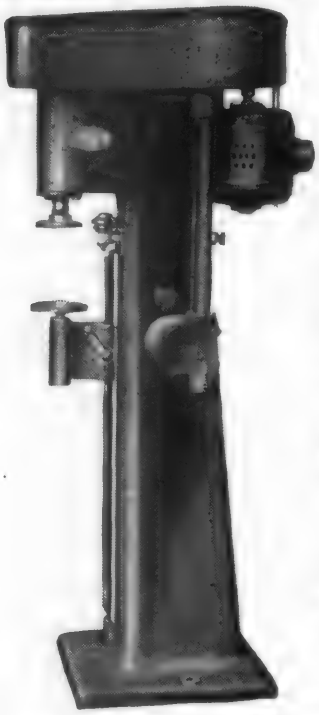

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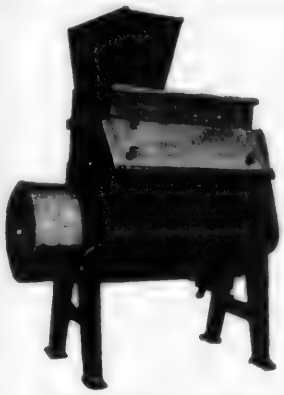

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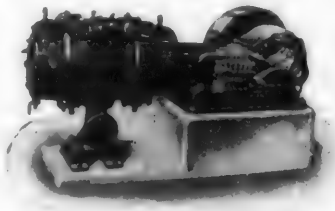

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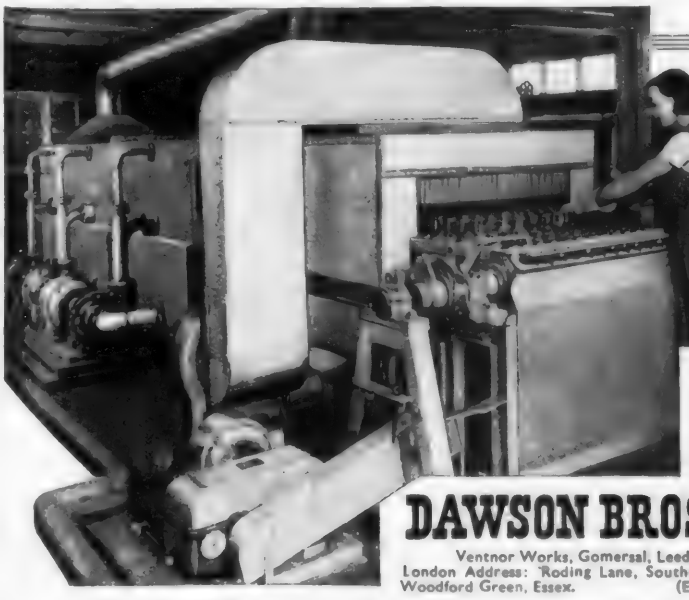

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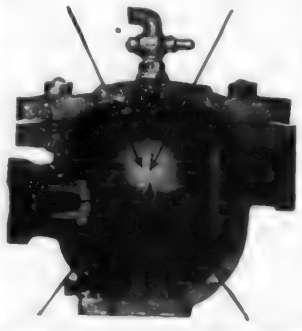

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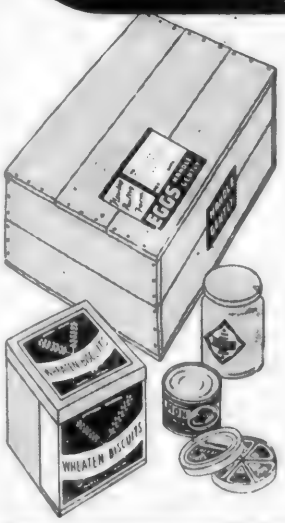

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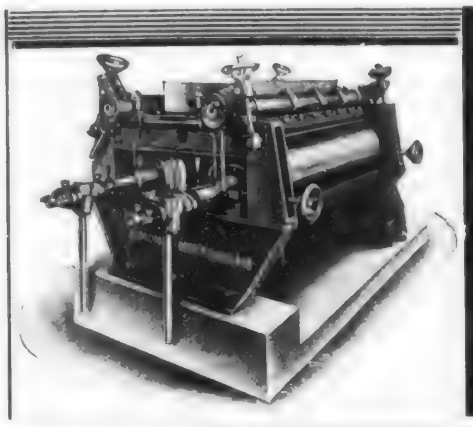

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WANTED, Hydraulic Fruit Press in good condition.—Write Box B358, *Food Manufacture*, 17, Stratford Place, London, W.1.

WASHING MACHINE for 1- and 2-lb. Jam Jars in good condition.—Write Box B359, *Food Manufacture*, 17, Stratford Place, London, W.1.

WANTED, in good condition, gas-heated jacketed pan, with side or bottom outlet. Capacity 10 to 20 gallons.—Write Box B353, *Food Manufacture*, 17, Stratford Place, London, W.1.

BOILER wanted, 4,000 lbs. per hour, water pressure 120 per 130 lbs.; good condition, must pass insurance.—Full particulars of type and price to Box B355, *Food Manufacture*, 17, Stratford Place, London, W.1.

EVAPORATOR wanted, Kestner "S" type, or similar type, throughput 4 to 5 tons per hour. Must be in good condition and complete with heater and stand.—Full particulars and price to Box B356, *Food Manufacture*, 17, Stratford Place, London, W.1.

WANTED, Cast-Iron Vacuum Evaporator and Condenser.—Please send details and price required to Box B352, *Food Manufacture*, 17, Stratford Place, London, W.1.

GRADER required, any type suitable for grading Onions considered.—Send offers to Box B339, *Food Manufacture*, 17, Stratford Place, London, W. 1.

WANTED, Hydraulic Fruit Press in good condition. —Write Box B341, *Food Manufacture*, 17, Stratford Place, London, W.1.

SAUSAGE FILLER wanted—28-lb. size.—Box B334, *Food Manufacture*, 17, Stratford Place, London, W.1.

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BOTTLE-WASHING Machine wanted for washing and sterilising new jars and bottles, capable of dealing with 1-oz. to 16-oz. jars and bottles at the rate of 100/120 per minute.—Box B322, *Food Manufacture*, 17, Stratford Place, London, W.1.

LARGE Bowl Chopper, Power Filler, and other equipment required by cannery.—Send particulars and price to Box B324, *Food Manufacture*, 17, Stratford Place, London, W.1.

WANTED, currant, sultana, dried fruit cleaning machine, large size.—Write Stillmore Manu-

WANTED, Gas-heated Pressure Cooker.—61, Ely Street, Stratford-on-Avon.

WANTED, Upright, Oil-Driven, Sausage-Filling Machine.—Particulars and price to Macnaughton, 423, Gallowgate, Glasgow, S.E.

CENTRIFUGE, 36 or 42 in., preferably Watson Laidlaw.—Box B298, *Food Manufacture*, 17, Stratford Place, London, W.1.

REQUIRED for Canteen on Government Contract one large electric refrigerator and one small. Full details, size, condition, lowest price or terms for six months' hire to Box B290, *Food Manufacture*, 17, Stratford Place, London, W.1.

WANTED, Gardner's Patent "Rapid" Steam-Heated Dryer, capacity about 60 or 100 lbs.—Lowert price and full particulars to Box B302, *Food Manufacture*, 17, Stratford Place, London, W.1.

WANTED, revolving-pan-marzipan-roaster and almond blanching machine.—Box B295, *Food Manufacture*, 17, Stratford Place, London, W.1.

MISCELLANEOUS SALES

WELL-KNOWN firm of London buying agents solicit enquiries from canteens for vegetables and general groceries. — For full information write Box B349, *Food Manufacture*, 17, Stratford Place, London, W.1.

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URGENTLY WANTED for essential purposes—second-hand copy of F. B. Wright's "Practical Handbook on the Distillation of Alcohol from Farm Products," originally published 1918 in New York, second edition, 281 pages. Write immediately giving lowest price including carriage to Box B345, *Food Manufacture*, 17, Stratford Place, London, W.1.

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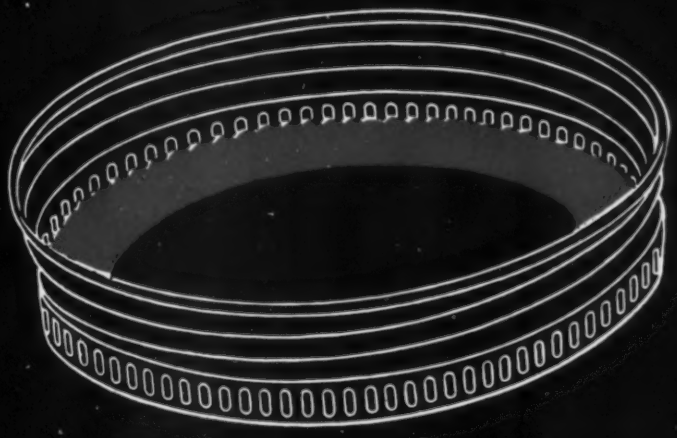

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